VOL. 30, NO. 3 May, 1923

THE PSYCHOLOGICAL REVIEW

OUTLINE OF A SYSTEM OF PSYCHOLOGY

BY RAYMOND HOLDER WHEELER

University of Oregon

Rarely if ever do our textbooks in general psychology emphasize a systematic viewpoint and relate various mental processes to one another sufficiently to give the student-reader a principle whereby he can knit the bulk of his psychological information into an organized whole.

For several years the writer has used in his advanced classes the scheme set forth below and in no instance has it failed to give the student a much clearer conception of the entire psychological field than he could obtain from general reading. Psychology is handicapped for want of exact experimental information; it has never sufficiently divorced itself from shaky philosophical notions; and it has not met with success in looking to physiology for its basic principle. It need not be argued, therefore, that psychology is in need of a fundamental principle by which its entire subject matter can be closely interrelated—a principle which will accomplish for it what the atomic theory accomplishes for the physical sciences.

Obviously a system must be functional as well as structural; it must do justice to the fact that mental activities play an all-important rôle in the organism's adaptations to its environment, and to the fact that it is behavior and not consciousness for consciousness's sake which in a last analysis claims the psychologist's attention both from a practical and a scientific standpoint.

The following scheme does not claim to supply a profound principle; indeed it offers nothing new. Its purpose is merely

that of being suggestive. It is based upon philosophical monism rather than dualism. It assumes that we do not and cannot know the ultimate nature of those phenomena which are called physical on the one hand and mental on the other. It insists, however, that we have no justification for theoretically separating mind and body either in a parallelistic or a double-aspect fashion. Rather, it prefers the concept that mental processes are in a last analysis organized or synthesized motor discharges and that the difference between mental process and motor response is a relative matter. Conscious activities differ from so-called physical activities only in degree. Their novelty of existence—their own peculiar and unique properties and characteristics—are real; but as processes they contain no unique or theoretically irreducible entity or substance. They are highly specialized and complex modes of 'physical' activities, deriving their peculiar qualities and attributes from a synthesis of nerve functions whose character is yet unknown. Consciousness is a function, then, of the brain just as muscular response is a function of muscle.

How it happens that mental activities which are in themselves so different from physiological processes going on in nerve tissue can be so different from physiological activities is not considered any more of a problem, in principle, than the problem of how sulphuric acid can be such a different thing from any of its ingredients of sulphur, hydrogen, and oxygen.

It is held, further, that the success of a psychological system depends upon its ability to relate, in causal fashion, mental with physical activities and to do this the data must be regarded in chronological sequences, not from the standpoint of simultaneous existence of aspects. In other words the important thing is not to relate a given mental process with its attending aspect, the physical process, but with its outcome in action.

The principle, then, laid down by this system is the view that mental activities are incipient motor responses of the organism. They are the beginning stages of overt acts.

Conversely, a coördinated motor response is the end-product or effect of so-called mental activities. Rather than call these activities mental, which confuses the issue, it is preferred to call them covert behavior. Muscular movements are then called overt behavior. Since by cause is meant invariable antecedent, covert behavior may be regarded as one of the contributing causes, at least, of overt behavior. The former may also be conceived as the first and the latter as a second stage in the development of any given response of the organism to its environment. A complete description of any act of behavior is not given until both stages are taken into account.

Figure 1 pictures the details of the system.

On one side of the diagram is represented the organism and on the other side, environment, to indicate that behavior is a relationship between the organism and its environment. The upper half of the diagram is devoted to acquired and the lower half to inherited behavior. Solid lines of the staircase indicate covert and the dotted lines indicate overt behavior. Ascending and descending steps indicate an increasing complexity of behavior phenomena and it is assumed that each step is built upon the phenomena appearing in the preceding step.

Vertical distances along the upper staircase represent the relative amount of memory involved in the examples of covert behavior there represented. Along the lower staircase vertical distances represent 'racial' and 'organic' memory. Horizontal distances from left to right along either solid staircase represent the extent to which attention and association are involved. Along the dotted staircases horizontal distances from the left-hand margin indicate the extent to which motor coördination is involved. The overt end-product of attention is called 'control' while the corresponding end-product of association is motor coördination.

To ascertain the overt end-products of any given form of covert behavior one follows the horizontal dotted lines extending to the right from the ends of the solid steps. In this scheme, will, in a broad sense of the term, is considered to be

the cause-and-effect relationship existing between covert and overt behavior; or in other words, it is the tendency for covert

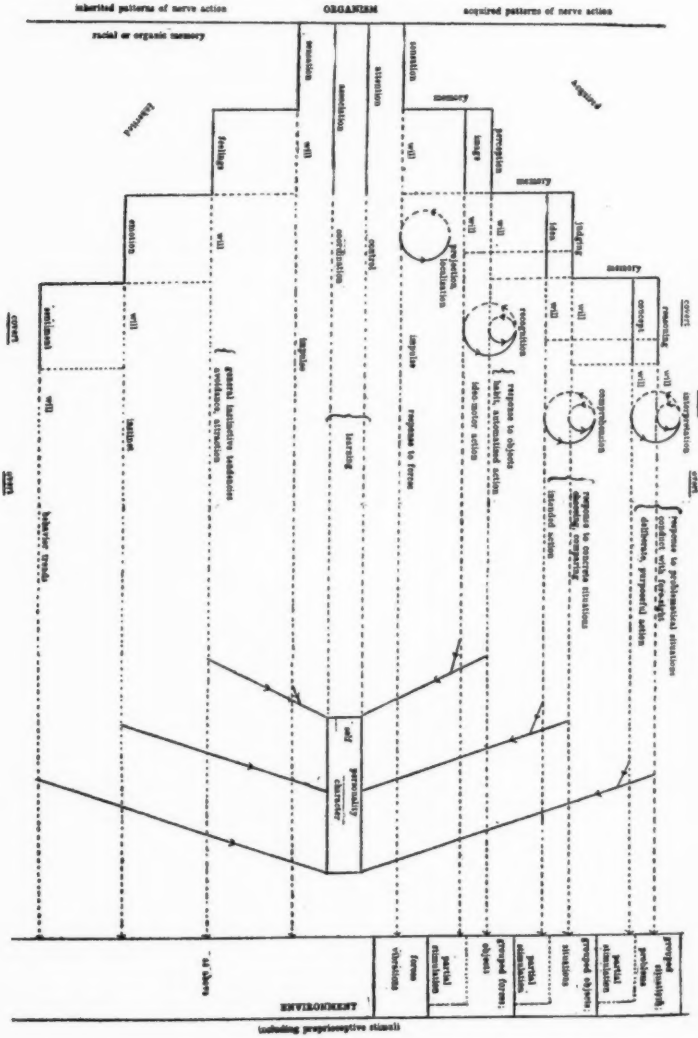

FIG. 1. Scheme for a system of behavior.

response to terminate in overt action. This tendency, regarded from the point of view of attention is called 'control.'

The scheme works out in more detail as follows. The simplest form of acquired covert behavior is sensation. The overt stage of a sensory response is called impulsive action. It is assumed that if an organism's covert behavior developed no farther than the level of sensation, movement would remain on an equally as primitive level. No complex coördinations would develop. Examples of sensory-motor reactions on this simple level in the human, might be, turning the eyes or head toward a strong visual stimulus, hearing a sound and turning in its direction, the relatively uncoördinated movements of trunk muscles in response to proprioceptive stimuli, drawing the hand away from a hot object, crying as the result of pain, sneezing as the result of an irritation of the nasal passages, and the like. It is evidently a mistake to call such acts as sneezing pure reflexes for the reason that we don't sneeze unless a sensory response develops first. In the writer's opinion the evidence is not at all conclusive that reflex action is not a very simple sensory-motor response.

Perception is a combination of sensory and imaginal responses complicated according to the laws of attention and association. The development of perception and an added degree of motor coördination go hand in hand. The overt stages of the perceptual response are for the most part such habitual and automatized coördinations as orient the organism in a world of three dimensions. The common, everyday movements of walking, dressing, eating, and the like are coordinated in large measure by means of visual and other sensory space perceptions with the aid of proprioceptive stimuli. The mechanized movements involved in performing skilled tasks such as the manipulation of machinery, driving an automobile, playing golf, typing, and the like fall within this category of overt responses whose first stages are processes of perceiving.

Judging involves combinations and seriations of perceptions according to the laws of attention and association, together with reproduced contents which we call ideas. The

grosser overt responses which follow from processes of judging are those which have already developed in connection with perceptions but which are now coördinated in a more complex fashion and extended into more prolonged series. That is, the control over overt behavior exerted by a given process of judging is more far-reaching than the control over overt behavior exerted by a given process of perceiving. Judging deals with concrete relations between objects; hence the resulting overt behavior might be called a response to concrete relations. For example, while one is walking along the street he may come to an obstruction and note that the distance around it to the left is shorter than to the right. As a result of this judgment he turns to the left. Or, in typing, he may note that he is hurrying too much and is making too many errors; as a result of this process of judging he changes his speed. Again, he may be buying a necktie and as a result of comparing one sample with another he finally picks up the one he wants.

Since processes of judging involve ideas, much of the resulting overt behavior is purposeful. Hence judgment results in a far-reaching control over conduct.

Reasoning is a complication and seriation of processes of judging. Here is involved a new type of reproduced contents which we call concept. The resulting overt responses consist of prolonged seriations and organizations of activities which have already been learned. They are practically always purposeful. They include one's overt actions involved in solving problems. For example, one may attempt to start his automobile and find that something is wrong. As a result of his covert reasoning processes he makes the numerous responses of inspecting the wiring, the timer, stepping on the self-starter repeatedly and so on until finally, perchance he discovers the trouble in an empty gas-tank.

Or again, one may be playing a game of tennis and after having discovered the weak points of his opponent, alter his own method of serving the better to win the game. Here the change of method, with its altered use of learned coördinations, is the direct outcome of his reasoning process. In this

way all of one's overt actions which are concerned with abstract situations, and with predictions as to future events, are end-products of reasoning. Here behavior is extremely complicated, for it results as well from judging and perceiving as from reasoning since reasoning includes a multitude of judgment and perceptual processes with their reproduced contents of ideas and imagery.

An image is defined in this system as an incomplete sensation. While we have very little experimental evidence bearing upon the problem of how images are stimulated, it seems to be a fact that all imagery involves movement of some sort. Visual imagery, for example, involves some eye-movement and a tendency for the muscles of accommodation and convergence to function as in actual vision. In the writer's opinion these muscular responses play an essential rôle in the development of visual imagery, giving to it a certain amount of peripheral stimulation. Were peripheral stimulation complete, that is, were retinal as well as muscular stimulations present, the resulting process would be sensation and not imagery. It has been the writer's experience, also, that auditory imagery involves a certain amount of muscular response including incipient eye and head adjustments. Likewise with all forms of imagery, some peripheral stimulation is invariably present. Attempts to inhibit these incipient motor adjustments invariably destroy the imagery in question. It is not suggested that certain types of muscular stimulation are essential to certain types of imagery in every case. But as a rule incipient tendencies to sniff, or a change in tonus of chest and nostrils are an integral part of olfactory imagery; incipient tongue, jaw, and throat movements are found in gustatory imagery, or else incipient changes in the flow of saliva into the mouth, none of which responses are sufficiently overt to be recorded by mechanical devices.

Ideas are defined functionally as incompletely stimulated perceptions and the concept as an incomplete process of judging. From a structural standpoint an idea is in part a complication of imagery—at least in its early genetic development. A concept in turn is a complication of ideas,

until it becomes mechanized or attenuated, when its content may be little more than a sketchy image.

The view that imagery, ideas, and concepts are only partially aroused sensory, perceptual, and judgment processes helps to explain such chacteristics of the former as their rapid appearance and disappearance, frequent vagueness, and their instability.

In the field of acquired behavior there is a series of phenomena all of which may be grouped under the term *meaning* and which may be divided for practical purposes into four outstanding levels of complexity. We have labelled this series of phenomena 'derived covert behavior' for the reason that an essential condition of its development is incipient explicit response. The simplest form of this type of behavior is projection or localization. Sensory responses not only lead to such gross movements as we have called impulse but to incipient motor adjustments as well. For example, the 'thereness' of a pressure sensation, a visual sensation, or what not, is a variety of meaning and is a product of incipient kinæstheses from delicate muscular adjustments of the eyes, neck, and possibly other regions. These kinæstheses form a synthesis with the original sensory responses. Probably some vaguely developed imagery is also involved. Projection, then, is a tendency of the organism to label, covertly, a sensory experience with respect to its own position in space.

This same labeling tendency is found on the level of perceiving. The covert behavior of perceiving leads to incipient bodily adjustments as well as to the grosser movements which we have already classified under habit and automatized reactions. These incipient adjustments constitute the well-known attitude of familiarity. Kinæstheses from this motor attitude blend and seriate with other sensory responses of perceiving and constitute, from a structural standpoint, the process of recognizing.

In like fashion the process of judging leads to incipient as well as to gross adjustments of the organism. These incipient adjustments may be varied and extremely complex in

their nature and have to do with the development of meaning. They may also constitute such motor attitudes as certainty, acceptance and rejection, and the like. As a result of these adjustments the reagent consciously notes relations; he labels these relations. This entire complicated form of the development of meaning we have called *comprehension.*

A similar procedure follows from the covert processes of reasoning and is called *interpretation.* Here, by means of complex but incipient motor adjustments and attitudes the individual becomes conscious of abstract meanings; he labels abstract situations. In other words, he interprets. Similar motor adjustments issue from images, ideas, and concepts; and the function of these is likewise that of producing meanings.

Each form of derived covert behavior functions as does covert behavior proper in leading to gross response. The difference between overt behavior thus induced and overt behavior induced by covert responses proper is the difference between reflective and non-reflective behavior. In the latter case an individual reasons without becoming conscious of meanings and acts accordingly, while in the former case he reasons, realizes reflectively the significance of his reasoning processes—he is conscious of meanings—and then acts accordingly. The latter is non-deliberative action while the former is deliberative.

For obvious reasons sensation is regarded both as an acquired and as an inherited form of covert behavior. Turning now to inherited behavior, the feelings or sense-feelings are interpreted to be patterns of sensory response of the first degree of complexity above sensation proper. Here are to be included pleasantness and unpleasantness, satisfaction and annoyance, and the like, in so far as these responses are not cognitive in character. The end-product of the feelings is a tendency on the part of the human organism to avoid or to become attracted to an object.

Emotions are complications of sensory and feeling processes. Their end-products are the more specialized instincts. For example, flight is the overt stage of fear; pugnacity is the

overt stage of anger; mating or caressing are the overt stages of the sexual emotions; and so on. Such organic reactions as are found in connection with the feelings and emotions are regarded as supplementary to covert stages of the response.

Sentiments become compoundings and seriations of the emotions. We have called their overt stages *behavior trends* as, for example, the behavior characteristic of the extremely religious person.

It is admitted, of course, that the feelings and emotions as experienced by the adult human are not purely inherited phenomena. Indeed, they are almost invariably mixed with cognitive processes.

Heavy oblique lines in the diagram indicate that all forms of behavior, organized into a system, constitute what we mean by the self. The finer dotted lines extending to the right-hand margin of the diagram point to those features of the organism's environment which function as stimuli for the mode of behavior in question.

There are four phenomena—attention, association, memory, and will—which are not covert responses *per se*. Association is an organized grouping or seriation of covert responses; attention is the particular mode or fashion of grouping within this organized complex. It refers to the number of details of content within a given context, and to the circumstance that one response within the complex dominates over the other responses. In this scheme those motor phenomena which have been regarded as accompaniments of attention are considered as inherent to the act of attending. From a behavioristic standpoint, attention is motor response—that particular motor response which at any given moment claims the use of the final common path of motor expression.

Memory is that process of modification which a sensory response undergoes when it is only partially stimulated. Hence as far as it possesses content, that content is always, characteristically, an image, an idea, or a concept. It is assumed that imagery of all kinds requires some external stimulation including at least proprioceptive stimulation.

The vividness of imagery in hallucinations is apparently due to the cognitive process of interpretation—to the vigorous motor reaction following the first appearance of the imagery. There is no evidence, in the writer's opinion, that hallucinations, no matter how vivid, approach the distinctness and permanence of sensation to such an extent as is often alleged.

Processes of recognizing, judging, reasoning, comprehending, and interpreting may take place in the absence of complete environmental situations and problems. For example, one may sit back in his chair and present himself a problem to be solved and forthwith solve it. Here, however, there is a considerable amount of proprioceptive stimulation, particularly from throat and tongue movements; and previous covert behavior functions, together with these incipient adjustments, as the organism's environment. Originally all the stimulation was environmental.

Broadly speaking the basic structure of covert behavior is presumed to be a discharge of nervous energy from the brain, this discharge involving motor as well as sensory nuclei. These discharges undergo some sort of process, perhaps, comparable to what we regard as synthesis, whereupon new properties and qualities arise which were not characteristic of the nerve discharges before the synthesis took place. The abrupt differences between the nature of motor discharges *per se* and covert behavior *per se* are hardly more striking, on second thought, than the differences between hydrogen and oxygen, *per se*, and water. Taking into consideration the fact that we know almost nothing about the nature of nerve action *en masse*, the theory does not seem entirely wild that covert behavior is derived from physiological activities.

These 'syntheses' are sensations. Qualities—redness, pain, sourness, and the like—are modes or patterns of these syntheses. For practical, descriptive purposes, these qualities may be regarded as contents. Sensation as a content, then, is synonymous with quality. Duration means little or nothing from a systematic standpoint. It is merely existence of one of these modes of covert behavior in or with

time, a trait quite as characteristic of any process whether it be regarded as physical or mental. For instance, duration is quite as much a property of the table's existence as of a sensation. Extent can be treated similarly. Any sensory process, to exist at all, must be as extended as any so-called physical process; *i.e.*, it takes place in space as well as in time. Thus duration and extent offer the same problems to the behaviorist as to the physicist in a last analysis. They are phenomena to be reckoned with in experimentation, but not phenomena which play any particular systematic rôle in psychology.

Intensity is the force or vigor of covert response. It is not peculiar to behavior phenomena. Clearness is either the detail of any given covert response and dependent, presumably, upon the extent to which motor attitudes attend the arousal of sensory qualities, or it is a matter of visualizing focally or non-focally an object of attention. Attention seems to be fundamental to clearness and is, therefore, the more basic concept.

No imageless or non-sensational contents are recognized in this system. Neither is the subconscious. Only one basic content, sensation, is recognized for covert behavior. The corresponding unit of overt behavior is muscular movement of a pattern variable with respect to its antecedent sensation but essential to the development of the sensation itself.

Further, it is assumed that no coördinated response is unconscious, at least when it reaches any considerable degree of complexity. Nerve discharges, as such, produce muscular contractions and not coördinated movements. The former must be integrated before coördinated action takes place. These integrated nerve discharges are *synthesized* discharges, or in other words, covert behavior (mental processes). Covert behavior, then, in the strictest sense of the term, produces motor coördinations. Once these coördinations are developed, a less and less detailed antecedent covert response is required, hence the well-known attenuation of the latter in habit formation.

Figure 2 represents this situation. The concentric circles represent nerve discharges and muscular contractions. The upper checkered region represents integration and its product, covert behavior; the lower checkered region represents coördination and its product, overt behavior. The shape of the diagram as a whole represents the reflex arc. Both covert and overt behavior depend upon the functioning of the entire reflex arc, together with the fact that both gross and incipient overt movements function proprioceptively as stimuli. Covert behavior, then, is the combined product of external and proprioceptive stimulation and in turn is a stimulus for overt response. Thus stimulus and response relations are in a way interchangeable just as is any cause and effect relation.

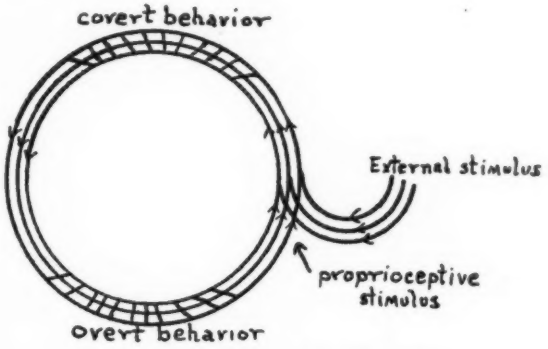

FIG. 2. Relation of covert to overt behavior.

There are many other features of the system which cannot be discussed here. Obviously the system has its weaknesses and it is admittedly speculative in spots. Its only claims are its simplicity for practical working purposes, its theoretical advantage in being monistic rather than parallelistic or dualistic, and its possible service in aiding systematic psychology to knit together such interpretations as have been at variance since the dawn of radical behaviorism.

THE INFLUENCE OF BIOLOGY ON THE DEVELOPMENT OF MODERN PSYCHOLOGY IN AMERICA

BY ARTHUR ERNEST DAVIES
Colorado College

With the publication of Ladd's 'Elements of Physiological Psychology' (1887), psychology in America entered definitely upon a new era. It is true that this book is the expression of a changed attitude toward the problems of life and mind which had been growing up in the latter part of the nineteenth century. Indeed, Ladd himself says, in the opening sentence of his preface: "There can be no doubt that an important movement in psychology has arisen in recent times through the effort to approach the phenomena of mind from the experimental and physiological point of view."

Before this period, psychology, in the modern sense, hardly existed; and the method and results of the study of mind were presented to the student under the title of 'mental philosophy.' In what may not inaptly be called the 'colonial period' of our science, literary and philosophical interests were largely dominant; and the influence upon instruction in this subject of such men as Porter of Yale and McCosh of Princeton can hardly be overestimated. Both men represented typical traditional opinions, and in neither of them had psychology come to a consciousness of its relationship to the natural sciences. Natural realism and philosophical common-sense dominated the teaching of the universities, and the prevalence of this type of instruction was due largely to the interest that university instructors had in the position of dogmatic spiritualism. "This appears," as Baldwin[1] remarks, "especially in the form in which philosophy and psychology were imported from Scotland to America and maintained there up to about 1880. Noah Porter and James

[1] 'History of Psychology,' Vol. II., p. 61 note.

McCosh were exponents of the official psychology in the universities and both were Reformed clergymen." How far the instructed mind since 1880 had been moving away from the position of dogmatic spiritualism, on the one hand, and the philosophy of common-sense as an adequate psychology, on the other, may be measured more adequately if it is remembered that Ladd was himself a clergyman, and that the 'Elements of Physiological Psychology' came from the chair formerly occupied by Noah Porter, and was published while the latter was still alive.

The character and direction of the changes which were brought into clear focus by Ladd's book have continued to control the work of psychologists to the present day. In that period, various movements have, as we shall see, arisen which have differed from one another in a number of respects; but whatever the fortunes that have befallen these movements, they have themselves contributed to a deepening of the position expressed by Ladd, and it is now generally agreed that some sort of acquaintance with the structure and function of the nervous system is a *sine qua non* of the psychologist.

After Ladd, the most important work is James's 'Principles of Psychology' (1890). Like everything James wrote, this book retains much that is characteristic of the older writers, while it follows the current which was carrying his contemporaries toward a frankly naturalistic port. No writer of modern times perhaps has come nearer solving the problem of 'eating his cake and having it' than James. It is one of the sources of his attraction; and no one but a 'spoiled child' could have written so much metaphysics in a book which promised to be a psychology 'without a soul' without arousing suspicion or anger. James was, I believe, naturally ingenuous; it was his foil against the sophistication of his age. But I have never been certain whether he did not fear lest 'the experimental and physiological point of view' which, of course, he accepted with the rest of us, might not be fraught with danger to psychology. Some ground for this question exists in the fact that he felt it necessary to explain why in his

smaller book he had added certain physiological chapters on the senses. The motives seem to me complex; and they indicate his reaction to the situation at the time he wrote. With all his colleagues James recognized, without advertising the fact, the value of anatomy and physiology for the psychologist, but his first book seems to say that these should be kept in strict subordination to the topic that, for the time being, was under consideration. They were instruments for use, not subjects to be taught by the psychologist. By the time he came to write the second book, he seems to have discovered that a sufficient knowledge of anatomy and physiology could not be taken for granted among those who were students or teachers of psychology; and rather regretfully, as a concession to the weakness of human nature, he supplies in this book the necessary information. I think his preference remained for a book that should contain no anatomical and physiological chapters. But whether this is so or not, the difference between James's two books reflects a situation in contemporary psychology with respect to the exact relation of anatomy and physiology to psychology, and it is very largely owing to James's influence that subsequent psychology took the course it did.

In the decade following the publication of the 'Principles of Psychology,' the only book that need be mentioned here is Titchener's 'Outline of Psychology' (1896). The importance of this book lies partly in the fact that it came from a writer who belonged to the younger generation of psychologists, and whose preparation for his professional work was not received at the then recognized shrines of Yale and Harvard. Ladd, James, and, we may add, Baldwin whose 'Handbook of Psychology' appeared in 1889 and 1891, were pioneers the influence and value of whose work could only be gauged by the impression it made on those who came after them. Titchener had studied under Wundt at Leipzig, and in his early and later work the experimental method, which had been vindicated by the Leipzig laboratory, gave color and tone to his presentation. Titchener's work illustrates what seems to be true generally of the experimentalists, namely, that

physiology and anatomy are held in somewhat strict subordination to the study of the facts of mental life. It is not that experimental psychology does not find in these ancillary sciences valuable assistance in the work it undertakes; the influence which experimental psychology has exerted is to draw more sharply than seems to have been done by Ladd the line between the 'experimental' and 'physiological' points of view. That is a decided gain and has not been without important consequences in the later development of psychology.

Turning to two other writers whose methods and points of view are very similar, we observe that the contrast that Titchener's work had emphasized between experimental and physiological psychology assumed in Calkins ('Introduction to Psychology,' 1901) and Angell ('Psychology,' 1904) the form of a distinction between what fifteen years ago was generally known as structural and functional psychology. The terms themselves are suggestive of the influence of anatomy and physiology upon the rapidly growing science of psychology; but they also point to a greater consciousness on the part of psychologists of the independence of their science. For with these writers the question is not at all whether they should correlate mental with neurological facts and processes; it is rather the contention that the mind itself—consciousness is the term used by Titchener, Calkins, and Angell—has a structure and function that it is the business of the psychologist to study. Indeed, Angell gives to his book the subtitle: 'An Introductory Study of the Structure and Function of Human Consciousness;' and in her Preface, Miss Calkins says that the purpose of her book is to lead students 'to the independent and careful study of their own consciousness.' Both these writers were greatly influenced by James, and the application in their writings of functional concepts to consciousness was doubtless owing to this fact. In other words, they gave a definite form to what I have suggested in a hesitating way above, namely, the preference of James for a psychology which should be as free as possible from the details which belong to the sciences of anatomy

and physiology. Neither of them indeed was able to avoid devoting considerable space to anatomical and physiological considerations; but it seems evident that both of them endeavored to give to the science of human consciousness, considered as an independent object of study, a form and method as exact as that which belonged to the natural sciences with which psychology seemed to be most closely related.

A study of the books that have appeared since 1904 reflects the various changes in emphasis and points of view that have guided the work of psychologists to the present time. There was a period in which the differences that are suggested by the work of Titchener, on the one hand, and of Calkins and Angell, on the other, were developed into a somewhat sharp contrast, and structuralism and functionalism, the terms of this contrast, were sometimes spoken of as distinct schools of psychology. Such a development was in the nature of the situation to be expected, but equally it could not be expected to last. The interest that centered in the struggle of these two points of view was somewhat lessened by the emergence of another standpoint which combines some of the motives that belonged to each of the prevailing movements. I refer, of course, to the growing interest that psychologists had in the problems of development, and to the consequent definition of a new branch of psychology, specifically called genetic.

Genetic psychology followed two main lines: the study of the growth of mental life in the child and the race, and the study of the mental life of animals. Among psychologists the common interests and connections of these two lines of inquiry are often obscured, and it is perhaps more customary to confine the term genetic psychology to the former, and to employ the term comparative psychology when referring to the latter. There was some reason for this multiplication of terms in the fact that investigation along the indicated lines grew up independently; but in retrospect it is evident that the influences that led to the extension of the psychological field in these two directions were in the main

XUM

the same. Both genetic and comparative psychology are the result of an extension of biological interests to the problems defined by the increasingly large place that consciousness was seen to have among the facts of life.

The point, however, we are chiefly concerned to emphasize is that genetic psychology in both branches is experimental and functional; and if it has not lent itself in any conspicuous manner to the elucidation of mental structure, it has brought us to a clearer understanding of the relation of psychology to anatomy and physiology than the so-called functional psychology had succeeded in doing. We may indeed say that it is through genetic psychology, in the comprehensive meaning of the term, that biology and psychology have joined hands. For while, as a psychologist, I am speaking of a conspicuous line of investigation as genetic psychology, it is interesting and important to note that not all the work in this field has been done by professional psychologists. A large though not predominant part of the labor has fallen to the professional biologist. For if, to speak only of the earlier work, we may say that Thorndike, representing psychology, led the way into the field of animal psychology, we may not forget that Jennings, representing biology, at the same time had important contributions to make to the same study; and if Baldwin led the psychologists in the investigation of the mind of the child and the race, it should be remarked that the biologists have come to realize during the past thirty-five years that mind cannot be eliminated from the facts with which their science deals. The exploitation of the problems centering in the nature and growth of mind in the animal species including man by biology and psychology in this early period has been continued also in the later developments of these sciences; and we may say, as a result, that genetics is no longer either a psychological or biological problem, but a psycho-biological one. The causes that have brought us to this conception are connected with the growing conviction among both groups of scientists that there is a much closer connection between consciousness

and the nervous system than our best knowledge at present enables us to define.[1]

In the last ten years or so another movement has appeared above the psychological horizon and assumed fairly articulate proportions. Whether we refer to this movement as behaviorism, behavioristic psychology, or psychology from the standpoint of a behaviorist, is for our present purpose a matter of indifference. Our interest in it is on account of the general relations that it sustains to the course of psychological development in recent times. In the writings of Watson, behaviorism is a reaction against the value and use of introspection as a psychological method, and it finds itself consequently in opposition to the view, represented for example by Titchener, that psychology is the science of the structure of human consciousness. The objection to introspection is not merely that its employment, in the nature of the case, is necessarily limited to the human subject, and therefore that the only way of approach to the animal mind is through the snares of analogy; the objection goes deeper than this in its denial that consciousness, as an independent object of investigation, is the proper object of psychological study. It is not necessary for behaviorism, in assuming this position, to take the bull by the horns and deny that there is such a thing as consciousness; it is both more subtle and suave than this when it asserts that if and though consciousness did exist it is irrelevant to the business of psychology as a science. In place of consciousness it would substitute behavior, and the accepted definition of psychology would be the science of behavior.

The development of the behavioristic point of view along the lines just indicated emphasizes only one of its sides and indicates its relation to only one of the main lines of modern psychological expansion. I have shown above that functionalism appears to us now as an interlude or incident in the history of modern psychology; it is very similar to, and arises from the same motives as, for example, the Spencerian soci-

[1] The latest statement of this point that has come to my notice is Prof. G. H. Parker's essay on 'The Evolution of the Nervous System of Man' in the recently published Sigma Xi lectures at Yale under the general title 'The Evolution of Man.'

XUM

ology. Both Spencerian sociology and functional psychology arose from the endeavor to apply certain concepts that had been defined and used in the field of zoölogy as principles of explanation for facts that had their existence in the fields, respectively, of social and mental life. Both of them start from an essentially defective logical method; and, in the case of psychology, the situation is complicated, from the behavioristic standpoint, by the fact that the so-called functions were capable of only an introspective observation. Function, that is to say, is definitively mental function; and when a scientific explanation is demanded of these functions nothing is forthcoming, in the words of Watson,[1] but certain 'time-honored relics of philosophical speculation' in the form of interactionism and psychophysical parallelism. With these speculative views removed from psychology, Watson feels free to claim that 'behaviorism is the only consistent and logical functionalism.'

The relation of behaviorism to genetic psychology may appropriately be introduced by this remark of Watson's. In the context in which it occurs, namely, in a paragraph which offers a criticism of historic functionalism, it would seem that Watson's contention is that if we got rid of the mind-body problem which has hampered, as he thinks, the functional psychologist we should in principle arrive at the position of behaviorism. But is behaviorism historic functionalism denuded of its philosophical concretions? I hardly think so; and I think as I do about the matter for the reasons that Watson himself gives for the distinction which he draws between his own views and those of the functional school. Whatever the improvements in form of which functionalism may be thought capable, the close relationship that this type of psychology has with introspectionism, together with the consequent insistence upon the reality of mental process, would make it impossible for behaviorism of the Watson type to sustain a case in court maintaining its claim to be the rightful heir at law.

Dunlap[2] seems to me to be much nearer the truth when

[1] 'Behavior,' p. 9.

[2] 'Elements of Scientific Psychology,' p. 35.

he speaks of behaviorism as the latest form of genetic psychology. It is true, as this writer points out, that genetic psychology starts from introspection; but it has developed a technique which clearly distinguishes it from introspectionism, in the usual meaning of that term. In its beginning genetic psychology was disposed to take the relation of psychology to biology seriously, and it endeavored to develop a method both of observing and explaining the facts of mental life which cut it free from the subjectivism of the introspectionists. Indeed, it is hardly too strong a statement that genetic psychology was grounded on the conviction of the importance of introducing into the field of psychological investigation objective methods of observation; and the success that has attended experimental pedagogy, legal psychology, the psychology of advertising, psychopathology —to mention only a few of the outgrowths of the main lines along which genetic psychology in its beginnings was developed—indicates that, in this latter object, it was not entirely unsuccessful.

Of the various movements that have been referred to in this paper, none has been more consistent than genetic psychology in its endeavor to arrive at an accurate observation and to give a trustworthy description of human and animal behavior. Nor does it seem that we need stretch a point in claiming that, for the geneticist, the word behavior was quite generally understood to mean what Watson calls 'environmental adjustment.' And, on the other hand, it is only to state the facts in the case to say that no group of psychologists has striven, with clearer recognition of what they were doing, to interpret behavior in neurological terms than have the geneticists. Of course, in calling attention to these two characteristics of genetic psychology, I do not mean to imply that there is no difference between it and behaviorism. My purpose, in the interests both of historic fact and clearness of thinking, is to give satisfactory reasons for connecting behaviorism with genetic psychology rather than with functionalism as is done by Watson. Behaviorism seems to be clearly motivated by the fundamental positions of genet-

icism, namely, behavior as the subject of psychological investigation, and the nervous system as the indispensable clue to the interpretation of behavior. If we went beyond this statement, it would be to point out that until behaviorism takes more seriously than it does at present the notion of development, genetic psychology will stand in the history of thought as that branch of psychology which most fruitfully used the conceptions that gave such impetus to all the sciences of the nineteenth century, and it will stand as the most typical organization of our knowledge of mental life from the evolutionary point of view. It is, I dare say, too early to indulge in a prognosis as to the course that behaviorism will run; but we may expect, if what I have been saying is true, that behaviorism will connect itself more and more closely with the advancing biological knowledge of our times; and there is none so old-fashioned as not to welcome whatever new light it will be able to shed upon the problems of life and mind.

In conclusion I shall summarize the main stages and important implications of the psychological development that has been briefly traced.

1. Since 1887 modern psychology is characterized by the increasing emphasis that has been placed upon experimental and physiological methods and points of view, and its course of development has been largely determined by the closeness of the relation which psychology has maintained with the anatomy and physiology of the nervous system.

2. Two general tendencies may be observed which are partly concurrent, but which appear in their strongest contrast if we compare the first fifteen years with, let us say, the last ten of the period under review. These tendencies are defined by the position that psychologists have taken with regard to introspection, and it seems that any assumed position of this question has a determining effect upon what is regarded as the proper subject-matter of psychology.

3. From the standpoint of those who maintain the usefulness of introspection, the proper subject of psychology is consciousness. There is, however, a difference in the di-

rection in which the science of consciousness develops according as the concepts of anatomy and physiology are taken more or less *au sérieux* by different groups of psychologists. Ladd, James, Baldwin, Titchener, Calkins, Angell are all introspectionists in the sense that they recognize a special order of mental facts which is not identical with the physical order of events; but some of these are inclined to devote more attention to the structure of this mental order, *e.g.*, Titchener, while others pay more attention to the changes (mental processes) which take place within this order, *e.g.*, Calkins and Angell. In the former case, we have analytical, in the latter functional psychology. In neither of these cases has there been an assimilation of anatomy and physiology, but only the employment of the concepts which are characteristic of these sciences, and the adoption of their experimental results in the attempt to convert psychology into an explanatory science.

4. The repudiation of introspection did not come suddenly; its field was gradually narrowed by the employment of other methods, and the consequent definition of the subject-matter of psychology in other than mental terms. The tendency which this situation represents we find, in a definite form, in genetic and comparative psychology. It is interesting to note that the observation, by both genetic and comparative psychology, of the behavior of the human and animal subject was accompanied by a recognition, on their part, of the more intimate relation of the nervous system with the facts of the mental life. There is no doubt that, for this group, anatomy and physiology are not nearly so foreign to the material with which the psychologist deals as they are for the structural and functional groups. The geneticists have somehow managed to assimilate more completely these biological sciences. For them biology does not so much operate on psychology from without, but is accorded a place within it; and the extent to which this is done, exposes the geneticists to the charge of throwing suspicion on the general assumption upon which all psychology proceeds, namely, the distinction between the mental and the physical order of events.

5. The outstanding feature of behaviorism, if and when it is carried to its logical issue, is the denial of the distinction I have just mentioned. In this sense it can be said that 'behaviorism is the only consistent and logical geneticism.' I do not see that behaviorism, so long as it remains on scientific grounds, can be criticized for starting with the reality and observability of behavior; but if and when it discusses the mental order, either as something that does or does not exist, it is open to the criticism of raising a question which, because the answer to it must ultimately rest upon an appeal to consciousness, undermines its own position. However, I do not wish to carry this remark further just now; what I am concerned to point out is that the logic of the situation out of which behaviorism arose compels the behaviorist to assimilate to his science (call it psychology or not, as you please) as much of modern physiology and anatomy as the exigencies of the problems it studies make necessary; and the more successful he is in doing this the stronger will grow the conviction that the distinction between the mental and physical orders is either unreal or negligible. There is evidence that the behaviorist of the extreme type is taking this path, and the literature is already full of the importance of the endocrine glands as a key to the scientific understanding of behavior.

I am not a reactionary who is inclined to squat on the right of way of any man or group of men, blocking the road toward a desirable scientific goal. Nevertheless, I am inclined to remind any one who is disposed to listen, that endocrine physiology is still in its infancy, and there is danger of imposing too great a weight upon even so lusty an infant; and, further, that nerve physiology is an expanding field of human knowledge which is more securely grounded, and we give up less, if we do not gain more, by following further than has yet been done the clues that are laid down in the nervous systems of reacting organisms.

THE PSYCHOLOGY OF MOTIVATION

BY F. A. C. PERRIN

University of Texas

A rather insistent demand for an adequate psychology of motivation has always been made by those who are interested in the control of human nature. It has come from economists,[1] sociologists, educators, advertisers, scout masters, and investigators of crime; more recently it has been voiced by certain psychologists, particularly those interested in personality and character, and in the various applied phases of the science. But orthodox psychologists, though generally inclined to recognize the existence of motives in human conduct, avoid specific discussions of motivation. It may be that the term is merely a synonym for any sort of psychological explanation, and a term, therefore, which is quite superfluous, but an increasing number of investigators thinks otherwise.[2] It is the writer's purpose in the present paper (*a*) to review some of the representative accounts of motivation found in psychological literature, and (*b*) to emphasize certain aspects of motivation which seem especially appropriate in a psychology of personality and character. In connection with this second purpose one central thesis is maintained—namely, that while the important human motives are distinctly biological in character, they also reflect a universal human desire for *prestige*. This view is original only in its attempt to synthesize three views already familiar to the psychologist.

We should note in advance that the term, motive, admits of at least two definitions. In the first place it refers to an 'inner' psychological process or function, a driving force to be found chiefly within the organism itself. And in the

[1] Wolfe (11), for instance, has explained the motivation of radicalism, largely in terms of the Freudian concepts.

[2] The problem of motivation is discussed by English in a REVIEW article which appeared some months back (5). The present writer acknowledges his indebtedness to English for certain suggestions on the general approach to the problem.

second place, the term suggests a plan, purpose, or ideal, with the definite implication of an ideational element. This second conception, of course, includes the first, but even more than the first it belongs to human psychology. It is not necessarily implied, however, that the plan, purpose, or ideal is consciously and overtly recognized in its true light by its possessor—for Freudian doctrine has influenced current psychological thinking too much to permit such a restriction.

The two definitions merely reflect two general psychological standpoints. In favor of the view which regards a motive simply as an inner driving force stands the fact that this usage makes the term available for the extreme behaviorist. If he so desires, he may speak of motives with the same justification that Watson speaks of emotions. A behavioristic motive may be an implicit bodily process or perhaps a neural drive, but it is a motive nevertheless. A behavioristic psychology which stresses motivation must, however, shift the emphasis from stimulus and response to stimulus, *internal mechanism*, and response. It may be argued, too, that this definition of motive does justice to the rôle of biological cravings in human behavior. We may properly speak of sexual motivation, and we may well believe that sexual reflexes can be aroused in the absence of specific ideational elements. On the other hand, motivation is properly a topic which belongs to human psychology (since we would scarcely speak of a cat's motives) and human psychology usually connotes the ideational factor. As the writer sees this situation, the difference between human motives and animal incentives to behavior is merely the difference between biological incentives in a socialized and intellectualized setting, and biological incentives which need only sensory stimuli for their arousal. And this view, in reality, sanctions either definition of motive.

Various Standpoints Regarding Motivation.—A survey of the different theories, ancient and modern, regarding motivation reveals, in the first place, a distinction between non-scientific, popular, and speculative theories as opposed to scientific theories. In the non-scientific theories, however,

XUM

we find the logical antecedents of scientific explanation, so that they deserve at least a passing glance. Scientific and psychological accounts of motivation are varied. They are stated in terms of physiology and of social psychology; they lean towards behaviorism and towards conscious motivation. The following survey is incomplete, but it probably includes the representative standpoints:

1. So far as popular and non-psychological opinion is concerned, normal motivation seems to be a dualistic affair, expressed in terms of morals. Ideals are the forces of righteousness, and they are opposed to appetites, or the demands of the flesh. In instances of abnormal motivation two sorts of explanation are frequently offered: the offender is either a 'beast,' or a person possessed of an evil spirit. But no problem is presented by abnormalities of motivation in the direction of the good—saints have ceased to exist. The popular treatment of motivation, of course, merely reflects popular religious and moral philosophy.

Possibly the first attempt actually to explain human motivation in terms of a definite psychological law found expression in the theory of hedonism. This again is a belief that is scarcely acceptable to-day, for as everyone knows, it presupposes a conscious purpose not established by introspective evidence, and it overlooks the impulsive phases of human conduct. As a matter of fact, few people know whether anger is a pleasurable experience or not. But the theory of hedonism, while logically unsound, finds a certain amount of support in the data bearing upon human motives. An analysis of concrete human desires discloses the fact that many individuals rather definitely know their own desires. They desire health, wealth, love, social and professional advancement, physical and æsthetic pleasures, because they know that these things are calculated to bring pleasure and happiness. It is only fair to ask, then, that a psychology which purports to explain human nature should deal honestly with its facts, and to suggest that a new hedonism may yet appear in philosophical thought.

2. As opposed to the speculative doctrines just mentioned,

modern psychology rests upon a biological basis, and while writers of current texts and expositions are in general agreement regarding the human organism, they differ somewhat in their conception of its integrative functions. Some writers, indeed, following McDougall, state or imply that a list of reflexes, instincts, emotions, and habits constitutes an inventory of human motives. Drever (3) is rather definitely committed to this view. This view is clearly atomistic in character, since it regards the human animal as an unorganized group of reaction tendencies, native or acquired, each of which functions in independence and isolation. This criticism, however, is scarcely applicable to a number of recent texts, for the present trend in psychological as well as neurological thinking is towards an increased emphasis upon the integrative functioning of the organism. Paton (7) identifies motivation with will, or voluntary and intelligent control, but he explains will in terms of simpler psychoneural processes. Will, however, is a complex factor coördinate with other factors; for, "Today we believe that from a standpoint of practical experience the will may be said to include all cerebral processes into which consciousness enters and which direct toward some definite goal. In this complex group *feeling*, *valuation*, and *motivation* are important factors" (page 225). Warren (10) defines motive, in his 'Glossary,' as 'a conscious or subconscious condition which plays a part in determining one's behavior or conduct.' Motives are referred to at various places throughout the text, where they are closely associated with ideals, and with interest, desire, and attention. Smith and Guthrie (9) devote a chapter to human motives, but they treat motives as a classificatory heading under which the delayed reaction, preparatory and consummatory responses, drive, overcorrection, and similar rubrics are placed. Woodworth (12) has much to say about motives. He explains how they fit into the stimulus-response program, for, as he says, "we must find room for *internal* states that *last* for a time and *direct* action" (page 71). Woodworth recognizes the biological aspects of motives, emphasized in the present paper, by stating that "Motives range from the

primitive or primal, like hunger, to the very advanced, such as zeal for a cause" (page 85). He refers to motives at many places further on in the text, in connection with the higher forms of behavior. We should mention, too, Woodworth's account of drive and mechanism (**13**) but space does not permit more than a passing reference to this familiar concept. Everything considered, the topic of motives seems to be occupying a position of increasing dignity and importance.

3. Whether or not the behavioristic standpoint is valuable or essential for a psychology of motivation depends upon the corollaries of that doctrine. Considered solely as the standpoint which regards demonstrable behavior as the subject matter of psychology, it sufficiently provides for all human motives in that it accounts for all phases of human activity. Jealousy, for instance, may be regarded consistently as a mode of behavior, existing only in terms of its manifestations. But it should be noted, nevertheless, that experimental technique has so far failed to provide a method for the determination of motives, and that the old-fashioned method of introspection is still the only one available for this purpose. Motives may be viewed as implicit physiological processes, and introspections may be called verbal reports or what-not, but the fact remains that such motives as jealousy, hunger, and the desire for material wealth can best be ascertained in individuals by their own self-observation and confession. More to the point, however, is the question raised in our preliminary statement—namely, that of identifying behaviorism with a too limited and rigid concept of stimulus and response. The undergraduate student at least finds it difficult to decide whether hunger is a stimulus or a response, and the fact that his perplexity finds some justification is acknowledged in Woodworth's recent *Psychology*. As the writer sees it, this concept of stimulus and response, while apparently and superficially adequate, is actually misleading, for it stresses out of proportion the momentary and immediate reactions, and it leaves out of account the motives which spring from the organic and social needs of the human organism. Behaviorism would not suffer, and it would

indeed profit, through an increased emphasis upon the "mental" mechanisms aroused by various stimuli and responsible for the various responses.

4. Freudian psychology, as formulated by Freud himself, not only swings away from the concept of stimulus and response in favor of inner motives, but reduces these motives to a single driving force. And the neo-Freudians, Adler and Kempf in particular, have advanced theories which recognize the problem of motivation as fundamental in the explanation of human behavior. An attempted appraisal of Freud and his followers would be out of place in the present discussion, but an acknowledgment should be made of their contributions to the writer's problem. Freudian literature probably deserves the greater part of the criticism which has been directed against it; but in our protests against the wild dream interpretations and far-fetched explanations of everyday acts which abound in this literature, we should not overlook its claims to serious consideration and its influence upon psychological thought. To state the matter frankly, the concepts of repression, sublimation, and of psychoanalysis in general, the emphasis upon the concealed and unrecognized character of many human motives, Adler's concept of the inferiority complex (1) and Kempf's theory of autonomic tensions (6) have given us something to think about. The psychoanalysts have at least tried to *explain* human conduct.

5. Social psychology has offered its own theories of human motivation. We are familiar with the concepts of imitation and suggestion, and with other explanatory principles which reduce all motives to a single formula. Such principles are useful, but inferior as explanations of human social conduct to Cooley's principles of social consciousness. In demonstrating the dependence of human beings upon their fellows for their moral and intellectual ideas and beliefs Cooley emphasizes what is probably the most significant fact in social motivation.

A Biological-Social View of Motivation.—It is evident that some of the views just mentioned are by no means irreconcilable. Cooley's principle can easily be harmonized

with the explanations of Adler, Kempf, and Watson. Adler's concept becomes applicable when we remember that the individual in his craving for recognition constantly seeks membership in a superior social group. The social climber has his prototype in scientific and religious circles, and when he does not seek a superior group he assures himself that his present organization is the best of its kind. Back of this ambition and energy, as our subsequent discussion will show, are the organic promptings of Kempf. One desires not only food, but food pleasantly and artistically served. And all of this, as we have stated before, can be translated into the language of behaviorism.

(*A*) In the first place, one may well believe that the modern emphasis upon biological considerations is not misplaced, for human motives seem to center fundamentally around physiological (or biological) desires or cravings. But since these desires originate in an organism which has reached an advanced stage of intellectual and social development, they usually find expression in an ideational and social background. The beginning step, therefore, in the analysis of human motives is to classify such desires and to ascertain the conditions under which they appear. But it is important to note that *all human biological desires are intellectualized and socialized.*

Three sorts of human biological activities may be described which are easily demonstrable in everyday life—namely, those concerned with eating and with hunger satisfaction, with the satisfaction of sex desires, and with the demand for physical comfort. This classification is submitted not altogether as an arbitrary and convenient one, but as one which does justice to the evidence furnished by actual observation.

Although four organic functions (sometimes more) are ordinarily described, only two find a place on our list; and no specific organic function is responsible for the third group of desires listed. Circulatory and respiratory activities seldom give rise to bona fide human motives, for the reason that their stimuli are mechanically furnished to the organism.

XUM

If, however, air were a commodity (as it is assumed to be in fictitious happenings on the planet Mars) the respiratory function would assume importance. And circulation, as we know, is even more an automatic and self-regulatory function. The wants of the organism as a whole, leading to the desire for physical comfort, are not usually thought of as constituting a specific function for the reason that they involve all other functions, but psychologically they prompt a number of motives which are discrete and overtly recognized.

1. The digestive functions give rise to a number of desires which are of psychological interest, especially when they are compared and contrasted with sex desires. Among civilized people they are not subjected to the repression and taboos of sex, and their expression accordingly necessitates no disguise. Eating is a public function, and although it is governed by the strictest rules of etiquette, it knows no moral law. Socially considered, eating occupies a prominent and seemingly permanent place in human behavior, for hospitality is manifested by the offer of food, while violations of table manners constitute the most reprehensible of social errors. Incidentally, the process of eating furnishes a supreme illustration of the fact that pleasure largely determines the æsthetic status of any activity, for, on theoretical grounds, nothing could conceivably be less appealing than the mastication and swallowing of food, but so intense is the resulting satisfaction that "good taste" has become synonymous with æsthetic appreciation.

In a very vital sense of the term, food activities are highly intellectualized. People *think* about good things to eat; intelligent and cultured people indulge without shame in pleasurable anticipations of hunger satisfaction. Of more interest, however, is the fact that human beings are much concerned over the æsthetic and social considerations connected with food. A well-appointed table, with its alluring display of linen, silver, china, and flowers possesses an æsthetic appeal truly comparable with the appeal made by a fine picture.

It does not follow from the foregoing statements, however,

that human biological cravings become lost in their social setting. Even fashion itself does not dare insult the physical body too brazenly, for while it dictates at times such a thing as an uncomfortable shoe, it more frequently sanctions bodily comfort. In general, *physical desires become the more acute, and their satisfaction the more intense, when they are socialized.* For most people, a meal eaten in solitude is a dismal affair. The smoker's enjoyment, too, is increased when his companion also indulges. Many writers, the Freudians in particular, unduly stress the inhibiting effects of social organization upon biological desires and satisfactions.

It should be noted that not all physiological desires are based upon biological needs. To mention an extreme example the cocaine addict will subordinate food and sex cravings to his desire for the drug. In fact, one could almost describe an entire class of human motives which owe their existence solely to the factor of habituation. And it is interesting to observe that motives prompted by habits are particularly strong when they involve physiological activities.

2. Sexual motives are exceedingly difficult to analyze, and the writer has no desire to attempt their detailed analysis in the present paper. Sexual motives, however, are very real factors in normal human conduct, and they cannot be ignored in a psychology of motivation. And without an undue amount of theorizing one may think of three levels of behavior which represent successive gradations of sexual motivation. They are as follows: (*a*) Strictly speaking, the one fundamental desire in this group is the craving for sexual gratification in its purely physical form. This, of course, is frequently an overt motive, fully recognized and acknowledged. (*b*) Closely related to this craving are a number of desires which, when manifested in an individual, are popularly referred to as displays of affection. These include such tendencies as the desires to fondle, to embrace, to kiss—tendencies which lead to some form of physical contact or proximity. Among university girls (at least) desires of this level quite often find a homosexual outlet, but it is significant that such homosexual displays are likely to follow some social event, particularly a

dance. They indicate, therefore, a heterosexual stimulus. (*c*) Less obvious in character are those numerous reactions which possess the common element of tender emotion. The sex factor in the pleasure aroused by a love story is sometimes unambiguous, but its presence in such reactions as the enjoyment of sentimental music is not altogether apparent. Expressions of sentimental emotion, however, quite often accompany a type of day-dream which is clearly and sometimes frankly sexual in nature. And this at least points to the possibility of other vicarious and sublimated forms of sexual motivation.

The principle that human biological desires are intellectualized and socialized finds no exception in the case of physiological sex cravings. These cravings are asserted, of course, when sufficiently stimulated, frequently with such intensity as to break down all rational and social inhibitions, but more normally they are manifested in accordance with the prescribed social laws and habits of thinking. On the positive side they are aroused under conditions which are primarily social, and not physical or animal, since the sex appeal made by an individual is strongest when it is reinforced by personal cleanliness, attractive and becoming costume, refined social behavior, and even by some indications of intelligence. And the negative or restraining aspect of sex motivation is likewise social. If we may generalize from observations made upon university students, young people are influenced most directly by social standards, and their greatest deterrent to sexual indulgence is the fear of losing social prestige. Many well-meaning people have criticized the fraternities and social clubs so popular in American student life, but they have overlooked the fact that such organizations literally furnish for their members a group consciousness, and a resulting code of behavior. In fact, the non-social individual is the one more likely to be governed by his natural biological cravings, or perhaps, to be influenced by some single individual. Moral ideals and a knowledge of the pernicious physiological consequences of loose sexual indulgence are definite restraining influences, but even these inhibitions are

effective only when they are shared by a group. Psychologically speaking, the moral problem is a social problem.

A number of correlations found to exist among the traits concerned with sexual likes and attractions are discussed by the writer in an article published elsewhere (**8**), in which it was found that in general such traits are closely related. Moreover, they are shown predominantly by people who are physically attractive and who lead an active, social life. As our results indicated, these same people are given to displays of affection, but such manifestations, while theoretically calculated to arouse sexual impulses, are frequently substitutes for them. This is particularly true where forms of physical contact are conventionalized and legitimatized, as in the case of dancing. For a variety of reasons, however, normal outlets for the sexual instinct are denied to many people, and where this is the situation, the resulting sublimation is more individual and more personal. It usually takes the form of day-dreaming, the most direct method of expressing unrealized desires. So far as the writer can ascertain, day-dreams prompted by sexual cravings are resorted to predominantly by girls, and they vary from dreams of the ideal man to consciously expressed desires which are sometimes quite frank. In the extreme instances where even the satisfaction derived from day-dreaming is prohibited, the result is a complete disavowal of sexual interests, and this is accompanied in most cases with a marked prudishness. Such extreme cases of negative reaction, however, are infrequently found in university students.[1]

3. The third class of human biological desires includes those which prompt the individual to seek general physical comfort, and to avoid physical discomfort. Human beings demand a pleasing degree of temperature, moderate degrees of sense-organ stimulation, easy chairs and beds, articles of clothing agreeable to the skin, a balance of muscular activity and repose, and health. These desires find their satisfaction primarily in the appropriate stimuli for the cutaneous, muscular, and organic senses. As compared with the bodily

[1] The preceding statements are based upon unpublished data obtained during the investigation just mentioned.

XUM

cravings for food and sex their position in the intellectual and social phases of human desire is more general, and perhaps more modest. Considered as a group, they represent the desire for luxury, and for the satisfaction which results from the even biological functioning of all organic systems.

The three groups of desires listed include the chief positive biological cravings.[1] To be well fed, to enjoy the experience of physical love, to be physically comfortable—the healthy, sensuous individual could ask nothing more from life. As a simple statement of fact, people will beg, fight, or steal for these ends. The negative aspects of biological desire, however, cannot be overlooked. These are the physical aversions, and they may be defined as organic protests against excessive indulgence or against inadequate stimulation. Food and sex stimulations in particular, when unduly prolonged, arouse the most intense reactions of aversion and disgust. And under certain conditions, such reactions constitute important human motives.

(*B*) It is easy to see how biological desires in human beings become ends in themselves, since they originate in known anatomical and physiological mechanisms. Just why, however, should people be so greatly concerned over the various forms of social recognition? As a matter of pure enjoyment, the average individual undoubtedly would prefer a compliment on his good looks to an excellent meal, although he possesses no elaborate system of organs for the former as he does for the latter. And we have just found that even biological desires require a social setting for their complete satisfaction. In an attempt to dispose of this psychological puzzle many writers fall back on an (assumed) instinct of gregariousness, but their efforts thus to explain the universal human demand for recognition are not entirely successful. Nevertheless, they are correct in regarding the phenomenon in question as biological, but they are wrong in viewing it as an instinctive entity. This will be made clear in the following discussion.

If the writer is not mistaken, an analysis of this craving

[1] Compare the desires enumerated by Dunlap in his 'Elements of Scientific Psychology' (4).

for recognition discloses the fact that it is characteristically competitive, and that it consequently prompts each human being to assert and assure himself of his superiority over other human beings. In other words, all social desires may be resolved into a general craving for prestige. When we observe individuals in their concrete social relationships, we find that they demand, in brief (*a*) to be noticed, (*b*) to be favored as objects of care and attention, (*c*) to be complimented and acclaimed, (*d*) to be loved; and that on the positive side they desire (*e*) to exercise power and authority. This list does not include the various forms of compensation and the numerous defense mechanisms which are resorted to when any of these demands are inadequately satisfied.

It remains to be seen if these demands imply an assertion of, or at least a craving for, superiority. To examine them in order, the most basic demand of all is satisfied when an individual obtains some sort of notice or recognition from his fellows. This is frequently a mere formal greeting, but even in this case the pleasure which it arouses is heightened just to the extent that it issues from a worthy or estimable person —that is, from a person capable of bestowing prestige, or of recognizing merit where it is found. The servant is thrilled at some sign of recognition from his master, and immediately lords it over the other servants less deserving of notice. To kiss the garment of a celebrity is an assertion of superiority as well as a token of subserviency. The same psychological effect is produced when one is recognized by a member of his own group, for the recognition is accorded by one of a chosen and superior circle. And while certain people glory in the fact that their circle of acquaintances is large, their attitude clearly suggests their position of eminence, for so few have attained such a distinction. Recognition, then, is a competitive affair, valued when it implies tribute to the person recognized.

Solicitude for the wants of others, with its implication of deference and respect, is an acknowledgment of worth and superiority. As a conventionalized social form it is synonymous with courtesy. Thoughtfulness is demanded of the

husband for the wife, of the host for the guest. And in romance, at least, the lover declares his willingness to be the slave of his beloved. *The biological significance of this attitude is apparent, since it provides for the satisfaction of physical wants.* Specifically, the courteous individual opens doors, offers food, carries parcels, for the object of his consideration. This type of behavior is a step in advance of recognition, for it is recognition expressed by signs which are both explicit and personal.

Compliment and acclaim are related to solicitude in about the same way that this mode of social behavior is related to recognition. Human beings love to be complimented, and for many of them, this desire literally amounts to a craving. So far as our point is concerned, there is no denying the fact that a compliment proclaims the superiority of the person so favored. When a genius is informed that he is brilliant, or a girl told that she is beautiful, it is clearly understood that the characteristics are distinctive. By means of words, an individual's marked excellence in any phase of personality, intelligence or character can be expressed, and for this reason, verbal acknowledgments of superiority are on the whole more effective in arousing pleasure than concrete manifestations of esteem.

Since the demand for love and affection originates in a specific physiological mechanism, it possibly differs from the other social desires in its independence of the prestige motive. In fact, if we are to trust everyday observation, the individual who is thoroughly in love cares little for the opinions of anyone save the object of his affection. In thus centering his thoughts and feelings upon one person, however, he does not for a moment surrender his position as a superior being. If anything, his self-respect and self-esteem are increased, for he merely narrows the social world until it revolves around two individuals. It goes without saying that the recipient of his emotion is superior, since love and admiration go hand in hand. This demand, therefore, is intrinsically egotistic, and it presents no exception to the general principle laid down.

The desire to exercise power and authority is the final and

overt expression of superiority. It is in truth a rather universal human trait, for it is found in both children and adults. As a phenomenon of adult psychology, however, this general desire often finds expression in ethical and justifiable forms. The father, for instance, is by tradition the head of the household. We have elsewhere stated that prestige is relative, and this fact is corroborated by the manifestations of authority observable in human beings. As every factory worker knows, the "straw boss" is frequently the hardest task-master. In its more refined expressions, the exercise of power is indulged in with more modesty. A man may be great and at the same time truly modest, but only the greatest seem to escape the suspicion of egotism and dogmatism. Few intelligent individuals are fooled by the political office holder when he pleads that he is the servant of the people. The desire to command and to influence men is indeed deeply grounded in human nature, and we may even say that it is an element in self-respect.

If it is true that all social motives presuppose a desire for superiority, it follows that they are biological in nature, and that they constitute an actual ego urge. As we have seen, the craving for love and affection is correlated with the physiological demands of a specific organic apparatus. It acquires a highly socialized aspect because it is aroused and satisfied by human beings. The remaining social desires, all concerned with recognition, esteem, and power, are likewise stimulated and satisfied by human beings, but their physiological mechanisms are to be found in the organization of the organism considered as a whole. They are *not* to be considered, however, as specific 'instincts.'

In the foregoing discussion the writer has attempted to harmonize the biological and social aspects of human behavior, and to describe the relationship which exists between the two. This relationship has been found, first, in the fact that human biological desires are highly intellectualized and socialized, and secondly, in the rôle of the prestige motive in human behavior. According to the considerations advanced, the prestige motive is basic to all phases of social conduct,

XUM

since it is involved in the various observable directions of social endeavor. But the prestige motive represents the socialized aspect of biological struggle, since its different forms can be traced directly to biological needs. It furnishes, therefore, an explanation of social conduct which can be conceived and formulated in terms of biological science.

References

1. Adler, A. Study of Organ Inferiority and Its Psychical Compensations. Nervous and Mental Disease Monog. Series, No. 24. The Neurotic Constitution. Moffat, Yard, and Company, 1917.
2. Cooley, C. H. Human Nature and the Social Order. Scribner's, 1902.
3. Drever, James. The Psychology of Everyday Life. E. P. Dutton, 1920.
4. Dunlap, Knight. The Elements of Scientific Psychology. C. V. Mosby Company, 1922.
5. English, Horace Bidwell. Dynamic Psychology and the Problem of Motivation. Psychol Rev., 28, 239–248.
6. Kempf, E. J. The Autonomic Functions and the Personality. Nervous and Mental Disease Monog. Series, No. 28. Psychopathology. C. V. Mosby Company, 1920.
7. Paton, Stewart. Human Behavior. Scribner's, 1921.
8. Perrin, F. A. C. Physical Attractiveness and Repulsiveness. *J. of Exper. Psychol.*, 1921, 4, 203–217.
9. Smith, Stevenson, and Guthrie, Edwin. Psychology in Terms of Behavior. D. Appleton, 1921.
10. Warren, Howard C. Elements of Human Psychology. Houghton Mifflin, 1922.
11. Wolfe, A. B. The Motivation of Radicalism. Psychol. Rev., 28, 280–300.
12. Woodworth, R. S. Psychology, A Study of Mental Life. Henry Holt, 1921.
13. Woodworth, R. S. Dynamic Psychology. Columbia University Press, 1918.

BEHAVIOR AND CONSCIOUS BEHAVIOR

BY CURT ROSENOW

University of Kansas

Psychology, like any other science, must attempt to describe and explain facts of some kind. The dispute between behaviorism and psychology as the science of consciousness is about the kind of facts with which we should deal. I shall attempt to show that conventional psychology has chosen its facts injudiciously, whereas behaviorism has been wise in its choice of facts, but has failed to describe them adequately. I shall attempt to show that this state of affairs is due to philosophical assumptions explicitly or implicitly made by the two contending factions. And I shall also attempt to show what psychology is like when these assumptions are no longer made.

The whiteness of the paper on which I write is a psychological fact to the conventional psychologist because he envisages it as a state of my consciousness. He must accordingly attempt to describe and explain it. Without attempting a critique of current descriptions and explanations, I shall at this point merely reiterate my doubt of the wisdom of choosing to attempt to describe and explain the whiteness of paper not as a characteristic of the paper, but as a state of my consciousness. To the behaviorist, on the other hand, the whiteness of the paper is not a psychological fact at all. He is interested in it, if at all, as one of the conditions of behavior, not as the kind of fact which he is attempting to describe and explain. He does attempt to describe the behavior which is conditioned by the whiteness, and his description is, I think, inadequate.

The mistakes of psychology as the science of consciousness were pointed out long ago by William James.[1] For example, in the field of perception, the perceived object either is counted

[1] 'Does Consciousness Exist?' *J. of Phil.*, 1904, 1, 477.

XUM

twice, once as an 'external' object and again as a state of consciousness or percept, or else the perceived object is taken merely as a state of consciousness and the reality back of the percept is accounted for in some other way, *e.g.* as congeries of atoms or ions. I do not wish to criticize either of the theories of reality implied by these psychological doctrines. I do wish to insist that both doctrines do imply theories of reality. In the crude incomplete form which one usually meets, they are difficult to classify. But the first resembles a realism which is not naïf because of the introduction of the percept. The second seems to resemble most closely materialism and epiphenomenalism. Now, as I said before, I do not wish to criticize these theories of reality, for that is the proper business of the philosopher. What I wish to do is to protest against the introduction of *any* theory of reality into psychology. Like the rest of my colleagues I am anxious to see psychology free itself from the historical shackles which still bind it to philosophy. And we shall never achieve this freedom so long as we insist on philosophizing before we begin to psychologize,—so long as we begin our psychology with an implied solution of one of the major problems of philosophy, the problem of reality. For to avoid philosophy it is necessary to know it as philosophy when one meets it,—or when one thinks it. And realism and materialism are philosophical positions. It is possible, I believe, to state the facts and problems of psychology without any assumptions, explicit or implicit, as to the nature of reality.

The unnecessary philosophical assumption made by the behaviorist is that the behavior he observes is physical behavior. Many psychologists will be surprised to hear it asserted that that is an assumption. Nevertheless, loving and hating, working and playing, are observable forms of behavior and I am not at all sure that they are physical forms of behavior, or that it is only the physical part of the behavior which can be observed. For example, laughter is a form of human behavior. Psychologists have taught that only the physical behavior can be observed directly and that the conscious aspect of the behavior of the laughing individual is,

somehow, inferred. Now there are rare occasions when the facial contortions of some one individual do need to be interpreted before we can tell whether or no he is laughing. But, ordinarily, no inference is needed. Ordinarily the observation of laughter, as such, is immediate and direct. If every form of behavior that can be observed immediately and directly by 'another' is physical behavior, then, by definition, laughter is physical behavior. But this definition has been forced upon the (unwilling) facts in the interest of a dualistic theory of reality. The dualism of mind and body is not an observable fact. It is a philosophical theory intended to explain certain really observable facts. This theory may or may not be true,—I am not concerned with that. I insist merely that it *is* a philosophical theory. And the doctrine that only physical behavior can be observed directly by 'another' implies this theory of reality, and consequently is tantamount to an unnecessary philosophical assumption.

There are aspects of human experience which lend themselves to the distinction between mind and body.[1] The distinction, possibly, antedates philosophy and, although philosophy has had its influence, it is in current common-

[1] Several critics have asked me what these aspects are. Limitations of space forbid an adequate reply. So far as I can answer in a footnote, they are the unusual, the unintelligible, and the contradictory aspects of experience, but this statement must be understood in an historical and evolutionary sense. One of the roots of the mind-body distinction goes back to the vague 'ideas' of our primitive ancestors and can be traced today in savage man. Such terms as Mana, Wakonda, and Manitou denote the 'cause' of ususual, unintelligible, and 'supernatural' phenomena. This idea, greatly refined, persists in the 'drives' and 'urges' of dynamic psychology. The other root goes back to the contradictory phases of experience. The ancient Greeks evolved the distinction between appearance and reality upon the basis of the illusions of the senses and other contradictions in experience. Much later, after a complex history, that developed into the primary and secondary qualities of Locke. Even today any dualistic view *must* provide the entities of its realms with qualities of some sort. And that logical necessity has given us structural psychology. Finally, if the roots of the mind-body distinction go back to vague and primitive ideas about the unintelligible and the contradictory, the distinction even today is not crystal clear, nor is it devoid of unintelligibilities and contradictions. Philosophy *must* face these difficulties. Naïf common sense will continue to ignore them. But psychology is not philosophy and should not be naïf. It will be well advised to avoid contradictions and unintelligibilities which are as contradictory and unintelligible today as they were two thousand years ago.

sense use. Common sense, to be sure, finds no problem in the distinction. Common sense has not defined mind and body in a fashion which makes any interaction between them impossible. Indeed, it has not defined them at all. Consequently it finds no difficulty in interaction. But, for centuries, the problem of the relation of mind and body has been one of the major problems of philosophy. In modern times, and before the advent of behaviorism, the psychologist was under logical obligation to solve this problem before he began to psychologize. The solution almost universally chosen was parallelism, usually with the understanding that it was not really a solution, but an arbitrary and, it was hoped, harmless way of disposing of the problem. Now the behaviorist who holds that only physical behavior can be observed directly, accepts the mind-body problem as a problem even though he seems to be insensitive to the logical obligation which he has incurred.

But, we may ask, how can the psychologist avoid dealing with mind and body if he acknowledges, as we have done, that there is an aspect of human experience which lends itself to this distinction. The answer is simple. The psychologist is under no obligation to solve every valid problem of which the human mind can conceive, and if he cannot solve the problem, the introduction of a distinction which implies the unsolved problem into the fundamental assumptions of a science is sure to cause trouble when the logical implications of these assumptions begin to function. Surely, if the *valid* problems of psychology, *i.e.* the problems which psychologists acutally work at with some hope of reaching a solution, can be stated without the introduction of such a distinction, clear thinking will be facilitated and the road to progress smoothed. But to make this progress possible, the behaviorist, who is asking conventional psychology to abandon one-half of the mind-body distinction, viz., the mind, should himself sacrifice the other half, viz., the body.

What is left? Let us consult Watson. Watson once asked, "What is it that the psychologist can observe?" And he answered, "Behavior, of course. But behavior on

analysis is the separate system of reactions that the individual makes to his environment. When we come to study the mechanics of such adjustments we find that they depend upon the integration of reflexes connecting the receptors with the muscles and glands." [1] This statement and others like it have given rise to the charge that the behaviorist endeavors to reduce human behavior to muscle twitches, a charge which Watson has at times indignantly repelled, though at other times he emphasizes (perhaps half seriously) his logical right to such a reduction.[2] Certainly, there is something about the style of the behaviorist which invites the criticism. I believe the key to this something can be found in a passage the authority for which I have unfortunately forgotten. At any rate, some author in the introductory pages of his book says, "The point of view of this book is behavioristic. That means, that we are interested in what human beings do, not in what they feel." A feeling, the behaviorist seems to think, is a state of consciousness and therefore to be cast into outer darkness. He fails to see that *to feel* is as truly a form of behavior as to chop wood. And it is this blindness, manifested as we shall see in other ways also, which makes it impossible for the behaviorist to give an adequate account of behavior.

There are other forms of behavior which the behaviorist fails to recognize as such. Watson says, "—the reader will find no discussion of consciousness and no reference to such terms as sensation, perception, attention, will, image, and the like—. I have retained such terms as thinking and memory, but I have carefully redefined them in conformity with behavioristic psychology. It is possible to retain attention, to redefine it." [3] It seems that the extent of the salvage is small. Thinking, memory, and possibly, attention is all that is worth keeping. What Watson fails to see is that to every state of consciousness which he rejects there corresponds a form of behavior. Sensing and perceiving, attending, willing, and imagining, all are forms of human behavior,

[1] 'Psychology from the Standpoint of a Behaviorist,' p. 13.
[2] *Op. cit.*, p. 40.
[3] *Op. cit.*, preface, p. viii.

even if they do not fit into Watson's patterns. For the nouns of conventional psychology we need but substitute the corresponding verbs to find behavior. No more than Watson do I believe it wise to study 'visual sensations.' But I do believe that *seeing* is a human activity well worth a place in psychology. Nor can I agree that this activity is properly described by a rehash of the anatomy and physiology of the eye and of certain sectors of the nervous system. Watson, for some reason, has overlooked such forms of behavior.

The reason for Watson's failure is not hard to find. I have already stated the philosophical assumption which is responsible. In the case of Watson this assumption is not made explicitly and there are passages which would seem to indicate that he does not regard the behavior which he is interested in either as physical or as mental behavior. But, aside from the fact that there are passages which would seem to indicate the opposite, the whole manner of his treatment, coupled with the fact, already mentioned, that he has failed to incorporate exceedingly important forms of human behavior into his psychology, seems to me to substantiate the charge that he regards human behavior as physical behavior.[1] The more conventional psychologist attempts to describe seeing as a mental process having some mysterious connection with a bodily process which, in itself, is not seeing. Having given the physiology of the bodily process (usually confining himself to the nervous system and the sense organ), he finds he has no other process or activity to describe, and so he gives the sensation, *i.e.* what the individual is conscious *of*, as the mental part. Perhaps, like Titchener, he commits a *tour de force* and calls the sensation a mental process. Perhaps, having described the physical behavior, he is content to dub the rest the *content* of consciousness, charging it up to some mysterious property of cortical nervous tissue. Watson, rightly enough, omits the so-called mental part (the sensation), but what he has left is the physical part, which, by

[1] "No one believes more thoroughly in the complete physico-chemical nature of all response, from the simplest to the most complex, than the author."—'Behavior,' p. 53.

hypothesis, is not seeing. But seeing can be described without describing it either as a mental process or as a physical one.

Before that can become clear we shall have to attempt some concrete illustration of what we mean by such an account. Let us take the behavior of seeing as our illustration, and let us attempt to describe it. At the very beginning let me emphasize that it is description, not explanation, which I shall attempt. The distinction is not, of course, an absolute one, but I shall stress it for what it is worth. Again, we shall attempt to describe the behavior of seeing, not the characteristics of what is seen. Nevertheless, the characteristics of the visual experience will give us a convenient point of departure. There is a characteristic difference between visual experiences and all other forms of experience. It is impossible, or at least difficult to describe, but every one who can see is familiar with the difference. Let us call this peculiar characteristic the visual quale. We know that this quale depends for its existence upon a specific sense organ, the eye. We know also some of the neural conditions of the visual quale. But all our knowledge of the anatomy and physiology of vision does not *explain* the visual quale. Let us then accept the visual quale without attempting to explain it. And let us define seeing, in preliminary fashion, as that form of behavior which mediates experiences possessing the visual quale.[1]

All experience has meaning. There are no meaningless experiences.[2] My next point is that the meaning of a visual experience (or a part of that meaning), is *seen* as directly and immediately as its color. Thus the expert checker player *sees* a move, the boxer an opening for a knockout, the billiard player a shot. The checker player does not see merely the present position of the pieces on the board; he *sees* some of the possibilities. The better he is as a player, the more does he *see* and the less does he have to *infer* in order to realize the

[1] In view of the preliminary character of this definition, the reader is asked not to scrutinize the term 'mediates' too closely.

[2] The significance of the term 'meaning' is fundamental to this article. It will be fully discussed below and, as the thought develops, will be used more rigidly than is done here.

possibilities. And, in the same way that we *see* the possibilities of the future, we *see* the probabilities of the past. Thus we see that someone has wept, not merely reddened eyelids; that there has been a fire, not merely the charred remains. The 'trained psychologist' will urge that much of what I have called seeing possibilities and probabilities is really feeling kinæsthetic sensations. He will point out that the move on the checker board is not really *seen*, but that the move is indicated by say an eye movement, and that the *feel* of this movement carries the meaning. Now I should be the last person in the world to deny that the eye movement occurs or that it means the move. I *know* it occurs, because during introspection I can feel the tension of the muscles. But I deny that in the direct, non-introspective situation, when I am giving all of my attention to the game, I *feel* such eye movements. The movement occurs, but it is not felt. It *is* a part of the behavior of *seeing*. Or, in language which I do not care to defend but which I use in order to make my position intelligible, the kinæsthetic experience which occurs is transmuted into a visual experience. Such transmutation may be incomprehensible;[1] it is, as I shall show, assuredly a fact.

The facts which I shall cite in support of this position are neither new nor unique. I refer to an experiment performed 25 years ago by George Stratton.[2] As the reader may recall, Stratton, in this experiment, placed before one eye a system of lenses which made things appear up-side down and with reversed right and left relations. The other eye was blindfolded. These lenses, of course, caused the eye-muscle coördinations which Stratton had built up during his lifetime to function unsuccessfully. That is, at the beginning of the experiment, movements which were performed unthinkingly and automatically ceased to produce the customary results. After two or three days there were brief intervals during which he had no difficulty in making appropriate movements. The best way to describe these intervals is to say that everything looked natural and there were no

[1] After all, seeing *is* an incomprehensible phenomenon.

[2] PSYCHOL. REV. 1897, 4, 341–360, 463–481.

questions of right or left, of up or down. But as soon as a blunder or hesitation occurred, *i.e.* as soon as the new habits ceased to function automatically, the scene looked up-side down again. In eight days Stratton acquired a new and adequate set of eye-muscle habits. And on the eighth day the scene *looked* as natural, as right-side up, as it did before he began the experiment.

It seems to me that these facts speak for themselves, if the reader will only let them. It seems to me that they say, "*We see things in the position indicated by our automatic, habitual tendencies.*" For the italicized words which I have just written are not the statement of a theory,—they are absolutely nothing but the accurate description of actually observed facts. Our habitual, automatic motor tendencies toward objects *do* point to them. And we *do* see objects where these motor tendencies point. We see with our muscles as well as with our eyes. For no one can urge that seeing an object to the right or to the left is kinæsthetic sensation. If that is not seeing, then there is no such thing as seeing.

Our description of seeing as a form of behavior is not yet finished. Nevertheless we may ask how it is that the psychologist has not heard the simple story which these facts tell us. Why is it that he has preferred obscure theory to illuminating description? I think it is because to the behaviorist as well as to the more conventional psychologist it is the nervous system which sees. More specifically, it is a very small part of the nervous system, the visual cortex which sees. A few years ago I put the following question to a psychological friend of mine: "Suppose that, in some strange way, all living tissue, blood and bone, sense organs and muscles, everything except nervous tissue were dissolved away and nothing but the nervous tissue left. Suppose also that this hypothetical nervous system were to receive precisely the same physical and chemical stimulations as it would receive were the entire organism alive and functioning in the usual manner. Do you think that such a nervous system would have experiences and that they would be the ordinary life experiences?" My friend winced a little, but he answered

affirmatively. At any rate he had the courage of his convictions. For any one who believes that certain happenings in the visual cortex run parallel with visual sensation *must* answer as he did. But before we accept so absurd a conclusion, let us look again at the facts. They will scarcely force such absurdities upon us.

Some of the generally known facts of vision are as follow. If the eye is destroyed, the individual can no longer see. It follows that the eye is necessary for vision. If the eye is left intact, but the optic nerve is severed, the individual is as blind as if he had lost his eye. It follows that the eye alone does not see and that the optic nerve plays a necessary part. Again, if the eye and the optic nerve are left uninjured but the visual cortex is destroyed, the individual is unable to see. It follows that the visual cortex also is necessary for vision. It does *not* follow that the visual cortex *sees*, or that neural happenings in the visual cortex are paralleled by visual sensations. The facts, all the facts, not alone the facts of cerebral localization, but facts such as Stratton has described and other facts which I shall cite, lend themselves to another interpretation.

Let me preface that interpretation with an analogy. In order to transmit sound by means of the ordinary telephone, a transmitter, a connecting wire, and a receiver are the minimum requirements. None of the three, alone and by themselves, transmit sound. All three, working together, do. Just so it is possible to look upon seeing as the integral working together of the eye, the nervous system, and the muscles and glands. None of the three, functioning in isolation, *sees*. All three working together, do so.

This interpretation fits the facts at least as well as the older view. The psychologist who makes visual sensations (and, for that matter, all forms of consciousness) run parallel with cortical happenings, does so, so far as he does not do it for metaphysical reasons, because, when the visual cortex is destroyed, and the eye and all of its subcortical connections are left intact, vision is nevertheless abolished. Therefore, he reasons, vision is a function of the cortex. But, the

destruction of the cortex also abolishes the integral working together of the eye with a large number of muscles and glands. And if this working together *is* seeing, the facts of cerebral localization are accounted for at least as well as by the hypothesis of parallelism and the debatable theory of the specificity of the cortex. Moreover, the indisputable fact that we see things where our automatic habitual movements point to them must be accounted for somehow. The assumption that the muscular response *must* be reported back to the cortex is purely gratuitous, has only ambiguous factual support, and is merely a logical result of the assumption that it is the cortex which sees. On the other hand, the position which I am stating does not look upon the response as a *muscular* response at all. The response for me is the integral working together of the partial activities. And that response *is* seeing. Or, one of the ways in which we respond to objects is to see them.

Before proceeding it may be well to consider some of the possible objections to this position. In the first place, it might be urged that on some occasions our automatic response is *away* from the object, and that nevertheless we see it where it is. I should reply that even in such cases the response away from the object is preceded by, or is synchronous with, one towards it. In order to turn away from a *perceived* danger, we *must* localize it. If we are warned of the approach of danger by a vaguely localized sound, we attempt to localize it more accurately in order to determine the direction of our flight. In the case of vision, the localizing response is often practically synchronous with the avoiding reaction, except in certain cases where the object is *perceived after* the avoiding reaction has occurred.

Again, it might be granted that the Stratton experiment demonstrates that the organic response gives us the *where* of the object, but, it might be urged, it does not give us the *what*. In reply I shall cite facts to show it to be plausible that it is by means of our automatic reactions that we see literally all that we do see,—spatial relations, meaning, and color.

So far as meaning is concerned the facts speak for themselves in fairly obvious fashion. Before we learn to read, we *see* black marks on a piece of paper. Afterwards we *see* letters, words, phrases, or even larger units. What we have learned is to make a different response and, consequently, we see differently. Again, recent observations have made it seem probable that re-education in aphasia occurs even though there is not regeneration of the injured cortical tissue which caused the aphasia in the first place.[1]

A particularly instructive case was related to me by Dr. Stella B. Vincent. The interesting features, from our point of view, were as follow. A woman, 70 years of age, sustained a cerebral hemorrhage in consequence of which she lost the ability to read, but retained the ability to write. For example, she could write a letter if not interrupted, but after a lengthy interruption she was unable to continue because she could not read what she had written. This woman taught herself to read by copying the large letters of the newspaper headlines into the palm of her left hand with her right forefinger. In this fashion she was able to recognize the letters and would spell out the words slowly and painfully. Later on she learned to read more readily. The obvious and easy way to account for these facts is to suppose that reading with this woman was, before the injury, a coördination of the eye and the vocal machinery, and that she learned to substitute a coördination of the eye with the writing machinery. But facts of this general character are sufficiently well known. The only thing at all novel is the direct and simple interpretation of the facts.

The seeing of color is a more difficult matter. In order to be clear, I must make my points carefully. My first point is that not every automatic eye-muscle coördination is seeing. I am not even sure that every automatic *habitual* eye-muscle coördination is seeing, but at this point I know of no clear-cut facts, though some of the facts of hysterical blindness lean in that direction. At any rate, as we have said before, when the visual cortex is destroyed the individual is blind

[1] Sheperd Ivory Franz, PSYCHOL. REV., 1921, 28, 81–95.

even though the subcortical eye-muscle coördinations are left intact. These eye-muscle coördinations, therefore, are not seeing. Let us assume now with the various color theories that there are in the retina certain specific sense organs whose functioning is correlated with the seeing of color. It would follow, by analogy, that not every automatic co-ordination of such a sense organ with a muscle is seeing color. And let us assume that the seeing of a given specific color *is* the occurrence of a certain specific reaction.[1] It would follow that the newborn infant cannot see that color (suppose it to be lavender)—that he must *learn* to see lavender—unless he has developed that specific reaction in the uterus. Now, although carefully controlled experiments on the color reactions of infants are not available (so far as I know), there is good reason to believe that the human infant is born with a few basic color reactions to bright and brilliant colors, or develops such reactions shortly after birth. On the other hand it seems quite certain that the baby is unable to make the delicate color discriminations which most of us learn to make later in life. According to the conventional view, if the infant fails to distinguish between pink and lavender, but learns to make this distinction later on, the two colors were present 'in consciousness' all the time as different (undiscriminated) sensations. But according to the view presented in this article, if the infant reacts in the same way to two colors which I recognize as pink and lavender, why then he *sees* them in the same way; where the adult sees two colors, the infant sees only one. Perhaps there is in the infant the potentiality of seeing the two colors in the same way that there is the potentiality of learning to play the violin, but the two colors are not 'in consciousness' any more than the oak is in the acorn. The infant will see lavender when he hits upon the reaction which *is* seeing lavender.

[1] I do not in the least pretend to understand why we should see a given color by means of one reaction and not by means of another. Perhaps, if we knew the phylo- and ontogenetic development of the behavior of seeing color, the mystery would be lessened. But, after all, seeing is a miracle whose occurrence should be forever a challenge to the philosophic mind. Nevertheless, I do not believe that the psychologist can afford to accept this challenge if he means to remain a scientist.

From such a point of view the problem of the locus of color is not a psychological problem. At this point I find it necessary to differ with Dr. Kantor. Kantor says, "The fact is that the physical object contains all the qualities, colors, sounds, tastes, hardnesses which we can ever analyze out of it." [1] In contradistinction I would say that I do not care in the least where the color really *is*, nor do I believe this question to be a proper problem for psychology. I am perfectly sure that colored objects are *seen*. If you like (I do not), color is *seen*, *in* the object. But the psychologist need not care where it *is*. Let us remember then that we are dealing with colors which are *seen*, not with colors which are 'there.'

Our description of seeing as a form of behavior is not yet complete. In order to emphasize as strongly as possible the difference between the view presented in this paper and that of the behaviorist who thinks of behavior as a physical process, I shall insist with Dr. Kantor that seeing is a form of conscious behavior. The term behavior, in the hands of the behaviorist, has been divorced from consciousness; so that, in his ear, the phrase conscious behavior will have a strange sound, as if we had spoken of a pink taste or a three-cornered sphere. In these circumstances it is the great merit of Dr. Kantor to have been the first to emphasize that some human behavior at any rate is conscious behavior. But what does the term mean?

Before we attempt to answer the question, we must realize that we cannot begin by defining the adjective 'conscious' and then inquire whether 'seeing' fits our definition. We must, first of all, examine activities which we do regard as conscious behavior, and then we must frame a definition which will fit the facts. Let the reader ask himself, in advance of any definition, whether he regards seeing as a form of conscious behavior. Once it is admitted that seeing is a form of behavior, I do not see how it is possible to call it anything but conscious behavior. All I ask of the reader at this point is that he should forget, momentarily, that any one has ever made a distinction between mind and body,

[1] 'Suggestions toward a Scientific Interpretation of Perception,' PSYCHOL. REV. 1920, 27, 209.

and that he should look upon seeing as a concrete natural phenomenon. Then let me repeat my question. Is not *some* human behavior conscious behavior? And, if it is, must not seeing be conscious behavior? And now let us discuss the meaning of the term.

Let us begin with the question whether seeing is a form of knowing. At the outset we must remember that we are dealing with a process which is distinctly not a verbal process by means of words. I have no wish to complain of the limitations of language. What cannot be made clear by means of language, cannot be made intelligible at all. But I do ask the reader to refer back occasionally to his own original experiences rather than to his stereotyped verbal conceptions. Coming now to our question, we must recognize first of all that the verb 'to know' may be either an active or a passive one. As a passive verb it does not indicate an activity but a state or condition. In that sense knowing is not a part of the behavior of seeing because it is not behavior at all. There is such a thing as a feeling of knowledge. Thus, if I am asked a question, I may feel that I know the answer. But 'to feel' *is* a form of behavior and is not knowing in the passive sense. When we take the verb in the active sense, the question reduces itself to this: Are the various activities which we call seeing in part or as a whole the same activities which we call knowing? So far as I can see, the visual activities are classifying reactions, and the classification takes place with reference to further action.[1] In some cases further action actually takes place in an overt way. I see an acquaintance and bow. In most cases, after classification has taken place, no overt action is called for. I see a stranger and pass by. But even here the passing by is different from what it would have been had I been totally unaware of the proximity of the stranger. It is a conscious passing by. It is the conscious carrying out of an activity consciously selected. The individual has been classified as one to be passed by and the action is performed. There is no genuine problem,—no problematic situation. Our automatic habitual tendencies are perfectly competent to take care of the situa-

[1] *Cf.* Woodworth, 'Psychology,' p. 427.

tion. But, nevertheless, both the classification and the subsequent action are conscious activities. I have been walking along the street; the stranger comes into view, around the corner, twenty feet away. There is no overt problem, but the seeing begins as a tendency to alter my present procedure and ends perhaps three hundredths of a second later by continuing it in spite of some slight inhibition. There need not have been an incipient verbal tendency. There needs to have been only a momentary focusing of the glance and a slight change in the tonus of some of the muscles of the legs, trunk, arms, and neck. But that, not the muscle twitches, but the total behavior taken with reference to that which this total behavior as a matter of fact refers, is seeing a stranger. It is classification with reference to further action. It is conscious behavior. Now if we wish to call an activity so immediate, so direct, and so automatic, 'knowing,' I can see no great harm in such a definition. But, if we adopt the definition, I would insist that it is a partial definition of the verb 'to know,' not of the verb 'to see.' For the knowing adds nothing to the seeing. Seeing is one of the forms of knowing. Seeing a stranger is, by such a definition, one of the ways of knowing him.

There is another way in which knowing and seeing may be related. It has been affirmed (and it has been denied) that whenever we see an object we also know that we see it. From such a point of view seeing would be more than a classifying reaction and, accordingly, we must discuss that point of view. Although my appeal will not be entirely to introspection, a certain amount of it seems to me to be unavoidable.[1] In the nature of the case, the introspective problem is difficult. We cannot observe the act of seeing without knowing it (the act). At the most we can resuscitate an act of seeing from the not too far distant past and introspect the memory. To some minds the very fact that we are able to remember the past activity will constitute proof that we knew it at the time of its occurrence. Beneath such

[1] The behaviorist may substitute 'verbal report' upon my own behavior for 'introspection.'

proof I would merely write 'non sequitur.' The alleged fact *may* be true. But I cannot see that it is a conclusion which follows logically from the fact that we are able to remember the past activity. Now, as I said before, I do not wish to rest my entire case on introspection. But I do wish to say at this point that my introspection tells me that we can, and often do, see without knowing that we are seeing. More generally, my position with reference to behavior is that it may be conscious behavior even though we are not conscious '*of*' the behavior. In order to see a chair, I must see a chair. If you like, I must 'know' the chair. But it does not 'follow,' nor is it invariably true, that I know that I am seeing a chair.

I know many of my readers will have the utmost difficulty with the statement that conscious behavior does not imply that the individual whose behavior is conscious, is conscious or aware of the behavior. I trust the difficulty will lessen or dissolve after we have worked out the distinction between conscious behavior and self-conscious behavior. Meantime an excursion into fields other than that of perception may be of service. According to James, the consciousness of the organic response which the organism makes to a stimulus *is* the emotion, *e.g.* my awareness of my increased heart action, of my irregular respiration, of my clenched fists, tense jaw, etc., *is* my anger. And this account is generally validated by the introspection of many psychologists. And yet, if anything is certain, it is the fact that the man who has given away to his anger completely is *not* conscious or aware of any of these muscular and glandular changes. Only in the milder stages of the emotion are we able to give a part of our attention to the study of the emotion itself. Introspection has shown us that emotion is the awareness of organic response, and yet, unless we do introspect, we are *not* aware of the organic response,—surely a curious paradox.

In the earlier stages of my own thought I tried to help myself over this difficulty by the formula that the emotion is not the awareness but the *feel* of the organic response. But at that time I was still thinking of the emotion as a state of consciousness and of the response as a physical one. If now

we can look upon the emotion not as a state of consciousness, but as a form of behavior without inquiring whether the behavior is physical or mental, the difficulty disappears.[1] For in that case, not the awareness of the behavior, but the behavior itself is, *e.g.*, grieving, and introspection makes us aware of some of the details of this behavior—it shows us how we grieve. We *might* say that grieving is a form of conscious behavior which becomes self-conscious through introspection, but if we did, some one would be sure to object that introspection may be needed to show us *how* we grieve, but not *that* we grieve. To grieve, and to know that we grieve, is, they would say, a logical distinction, but not a psychological one.

Now I do not mean to deny that much of the conscious behavior of the normal human adult is self-conscious behavior, even at the time of its occurrence. A good deal more is just conscious behavior, which becomes self-conscious in retrospect. (A reasonably good illustration is the case of the man who, when told not to get excited, affirms that he is not, but knows that he was before he finishes his excited rejoinder.) And finally there are the cases where the behavior was conscious behavior which was not known at the time of its occurrence, and which was not retrospected. In the nature of the case, the individual who has such experiences cannot observe them directly. He may, however, obtain knowledge of them indirectly. For example, a few days ago I said 'Binet' when I should have said 'Terman,' and did not know that I had done so even after a member of the class to which I was lecturing called my attention to the slip. And yet, I was not momentarily unconscious. What had happened was that I had become unusually interested, and the censorship which I exercise habitually over my speech had relaxed. So I did not know, in detail, what I said at the time I said it. Nevertheless, my utterance of the word 'Binet' was conscious behavior. Had I been questioned soon enough, I would have been able to remember saying it. As it is, it will remain one of many conscious acts which I have never known

[1] We would, for example, study 'grieving,' not 'grief.'

XUM

directly and never will know directly. Ordinarily, in lecturing, I talk partly to the class and partly to myself,—ordinarily I know what I am saying—for a moment I had let myself go and was talking to the class only. Accordingly I heard, but did not *know*, what I was saying. It is the same with most other forms of behavior. As adult human beings, we are able to observe our own behavior and frequently do so. But we do not do so always and, when we do not, our behavior is merely conscious behavior. Seeing is usually merely conscious behavior, for it is an activity which we perform so automatically and so well that it is difficult to observe, and requires very little attention. Our attention, in seeing, goes to the object seen, not to the behavior of seeing.

According to the view here presented, behavior is self-conscious behavior when the organism knows its own behavior. But this knowledge is not a state which happens to the organism. Knowing its own behavior is something which the organism does. So the question becomes pertinent,—What is it that we do when we know our own behavior? As I see it, the bare fact that my behavior affects the sense organs in my muscles and that these 'kinæsthetic sensations' are in turn responded to, does not necessarily constitute knowledge of the behavior. If it did, a dog who scratches a flea bite would not only feel the bite, but would know that he feels it. According to Mead, the organism achieves self-consciousness when it reacts *socially* toward itself.[1] The logical unit of all behavior is the act. The unit of social behavior is the gesture. And the gesture is an unfinished act which means the complete act. Thus, during the preliminaries to a dog fight (to use Mead's illustration) the beginning of an attack means an entire attack, but before it has gotten under way it is met by the beginning of a defense, and thus is never finished. Nevertheless, by means of the gesture the one dog means to attack, and the gesture means an attack to the other dog. Later on, in human development, gestures come to mean things or objects, but the gesture itself remains

[1] *Cf.* 'What Social Objects must Psychology Presuppose?' *J. of Phil.* 1910, 7, 174. 'The Mechanism of Social Consciousness,' ibid., 1912, 9, 401. 'The Social Self,' ibid., 1913, 10, 374.

an activity, and when the individual addresses a gesture to himself in very much the same way that he would address it to another, he also perceives it in a manner analogous to the way he would perceive it were it addressed to him by another; that is, he perceives the meaning of the gesture socially. The gesture of the dog is merely conscious behavior, because it is not addressed to himself by himself and thus he does not perceive the meaning of his own activity socially. He means to attack, but that is perceived by the other dog, not by the dog who is doing the attacking. The entire attention of the attacking dog is on the behavior of the defending dog, not on his own behavior. But when an individual addresses a gesture to himself—let us say he is criticizing himself—he not only means to criticize, but he also perceives the meaning of the criticism.

The gesture which the individual addresses to himself is an idea. The dual process of addressing one's gesture to oneself and perceiving the meaning of one's own gesture socially, is thinking. It makes little difference whether the gesture is overt or implicit. That is a matter of taste in formal definitions. The implicit gesture is of enormous importance because, usually, it cannot be perceived by others. Thus, in addressing implicit gestures to himself, the individual creates a new world in which he may live—the world of ideas. In a way, it is a solipsistic world, because within it all meanings refer directly to the individual. Thus, my behavior of seeing a friend, means the friend. But my behavior of thinking of the friend, means the friend—to me. In thinking, the organism addresses a social activity directly to itself and perceives the meaning of that activity socially. In perceiving, the organism addresses an automatic nonsocial activity to an object—even though that object be a part of its own body—and does *not* perceive the meaning of his own activity socially. Now inasmuch as we do perceive something, viz., the object, and inasmuch as the reader will say that the object has meaning *to him*, the reader is likely to be puzzled. The difficulty lies in the dual significance with which custom has endowed the word 'meaning.' One of the

senses in which the word is used lies entirely within the social situation which the individual creates by social interaction with himself. In that situation every idea, *i.e.* every gesture, has a double meaning or reference. Thus, if I ask you to open the window, my gesture means 'the window' indirectly, but directly it means you. If I think about opening the window my gesture means 'the window' indirectly, but directly it means myself. But if the stuffiness of the room induces me to *see* a-window-which-I-mean-to-open, why then that is precisely what I see. *The activity in this situation has only one reference, and that is not a social one.* A hungry dog, perceiving food, means to eat it. That meaning is not 'in' the food nor 'in' the behavior. 'Meaning to eat it' *is* the behavior. And the dog perceives what his activity means. Psychologists have transplanted the dual significance of the word 'meaning' from the internal social situation where it has its proper place to the non-social situation, where it falsifies the facts.[1]

I feel that a little more space can profitably be devoted to the discussion of the word 'meaning.' I wish to add only that, when I use the term, I shall intend the present participle of the verb *to mean*. If I do use the noun, it will be used as the word 'motion' is used. In other words, I think of meaning as an activity only and, I may add, as the most fundamental activity of the conscious organism. In that sense the question of the residing place of meaning cannot arise. It becomes as impossible to ask whether the meaning is 'in the object' or 'in the mind,' as it is to ask whether the motion of the earth is in the earth or in the sun. The earth moves about the sun in a certain describable way and that is all there is to it. In the same way, a given behavior either means something, or else it does not. In the sense in which I use the word, I cannot find that the behavior of inanimate objects means anything. If an oak leaf flutters to earth, it is correct usage to say that that event has meaning, or means something. That usage, however, is inconsistent with the

[1] With reference to the relation of the visual 'image' to the gesture, limitations of space compel me to refer the reader to an earlier article of mine, 'The Genesis of the Image,' PSYCHOL. REV. 1918, 25, 302 ff.

usage which I derive from the observable facts of my own conscious behavior. If an oak leaf flutters to earth, I can perceive it or think about it, *i.e.* I can mean that event. That is observable fact. But there is no observable activity of the oak leaf or of its fluttering which can properly be called meaning in the active sense. The inconsistent usage of the verb *to mean* has been derived from an incorrect analysis of the thinking process. Ideas (or images) occurred in the mind, and these ideas *had* meaning. But a gesture is only an activity of the organism. In the last analysis it is the organism which gestures—it is the organism which means.

We are ready to answer the question which we asked some pages back. What does the term 'conscious behavior' mean? What is it that distinguishes human behavior from the behavior of sticks and stones? In summing up, let me again resort to an analogy. Walking, swimming, and flying are very different forms of behavior. And yet they are alike in that all three are forms of locomotion. Locomotion is not something which is added to the walking, swimming, or flyng, but these three different forms of behavior *are* three different forms of locomotion. In the same way, there are thousands of forms of conscious behavior. They are alike in that all *mean* the stimulus to which they are addressed. I do not mean to indicate merely that they mean something to an observer, for that is true even of unconscious behavior. Nor do I mean that conscious behavior means something '*to*' the acting organism, for that is true only of self-conscious behavior. But just as the organism walks or swims or flies toward a goal, so does every conscious act of the individual mean its stimulus. (As Dewey puts it, the response is *into* the stimulus.) [1]

I have developed the terms 'conscious behavior' and 'meaning,' until at the end they mean one and the same

[1] I do not believe that a formal definition of the term 'to mean' is possible. It is the conscious behavior of an organism, but is not necessarily an experience of the acting organism. In self-conscious organisms it can become an experience. As an experience it is primitive and cannot be defined any more than the color blue can be defined. But, like the color, it can be pointed at by means of words. And that is what I have attempted.

XUM

activity. That is my final conclusion. But in the earlier pages of this article I have not always used these terms in their final meaning. Indeed, in the sentence I have just written, I have no logical right to speak of the meaning of a term. Terms (written or spoken gestures) are meant by human organisms; they do not mean. These apparent inconsistencies are not entirely concessions to ease of diction. I have tried to put myself into the place of the reader and have tried, however unsuccessful y, to develop *his* thought. We end with the position that experiences are meant by the individual, and that the experience itself does not mean anything, so far as can be observed, unless it is, in the language of Mead, a social object, *i.e.* an individual engaged in social intercourse with another. Do non-social experiences mean anything in their own right? Psychologically, *i.e.* so far as can be observed, they do not. It is legitimate to go beyond observation and to speculate. Here, then, we encounter a philosophical problem. But we encounter it at the end of our psychology, and not at its beginning. *That* unsolved philosophical problem is not embedded in the very foundations of our psychology.

My argument is finished. It may be useful, however, to hint briefly at the appearance of a psychology written from our point of view. There are many forms of conscious behavior which we know only as chemical, physical, or physiological activities. In such cases we do not know what the organism means when the behavior occurs. These cases constitute the valid problems of psychology, for I believe that the fundamental problem of psychology is to discover the meaning of conscious behavior. In some cases the task is a very easy one. We need but to reinterpret the jargon of conventional psychology. Thus the behavior of convergence means the distance of the object. Not so easy, but more important, interesting, and convincing are the numerous cases of abnormal behavior which constitute genuine problems until the meaning of the behavior has been discovered. Let us take the following case, reported by Janet.[1] A young girl

[1] 'The Major Symptoms of Hysteria,' 2d ed., p. 127.

had overheard her parents discuss and bemoan their poverty and was very much upset by what she had heard. That night, in her dreams, she was heard to mutter over and over again, "I must work—I must work." At the same time she made certain movements of the leg and hand which were later on identified with movements which she made over and over again at her daily work in a factory where she worked at a machine, operating a pedal with her foot and a wheel with her hand. Next morning when she awoke the verbal part of this reaction had disappeared, but the leg and hand behavior persisted. At the time, neither the girl nor any one else knew the meaning or significance of these movements. What did the behavior mean? Surely, that is not difficult to surmise after Janet has discovered for us the facts which answer the question. We must remember, however, that the behavior was not verbal behavior and that therefore the meaning was not verbal either, though it was gestural when it first occurred. Our only recourse, however, is to translate the meaning into words, and then, obviously, it becomes—"I must work, I must work hard and earn money for my parents." That is what the gesture meant, but, for reasons which we cannot go into in this article, the child had lost the ability to address this gesture to herself. The gesture therefore was not a self-conscious one. It was conscious behavior, and not physical behavior with an unconscious state of consciousness running parallel to it.

The annals of abnormal psychology are full of cases which would be clarified through the introduction of the idea of conscious behavior. To be sure, there are in abnormal psychology other and more important problems than that of unconscious consciousness, but the removal of that mysterious, meaningless, and misleading phrase will go far toward putting the feet of the psychologist (and the psychiatrist) on the path which will lead to the facts which will answer his questions.

In concluding, let me say once more that conscious behavior is as objective as a muscle twitch. That is, it can be observed by any one. It is not true that the acting individual

is directly and immediately aware of the meaning of his act; that others must reach this meaning by a process of inference. When we observe the behavior of one who is grieving, we do not observe physical behavior. As a matter of fact, the so-called physical behavior is abstracted, in the interest of a philosophical bias, from what is actually observed. It is the *physical* behavior of the individual which is reached by a process of inference. What is actually observed is the conscious behavior of the individual. To be sure, the meaning of the behavior may be *seen* erroneously,—the individual whom we see to be grieving, really may be shaken by laughter. The meaning of the conscious behavior may not be always so obvious that it can be *perceived* correctly,—else psychology would have no problems. Even the individual who is acting self-consciously may be mistaken about the meaning of his own act. Infallibility is not a characteristic of any method of observation. But conscious behavior can be observed by 'another' and by oneself, and the accuracy of the observations and the validity of the inferences based upon such observations are subject to the established canons of scientific observation and inference.[1]

[1] I wish to acknowledge an indebtedness far greater than indicated by the formal references in this article to the views of my former teacher Geo. H. Mead. Also I wish to acknowledge a more indirect debt to the influence of President James R. Angell.

A BEHAVIORISTIC ACCOUNT OF THE EMOTIONS

BY EDWARD CHACE TOLMAN

University of California

The emotions are now being investigated in new places. Interest is no longer centered exclusively upon adult normal humans, but is turning to subadults, subnormals, and subhumans. But these suborganisms cannot introspect. This sets a problem. How does one identify the emotions in these suborganisms? If one is studying anger and fear in infants and imbeciles, how does one decide when it is anger and when fear? It would seem that some explicit statement and agreement concerning such difficulties might well have preceded actual experiments. Perhaps fortunately, however, men (including psychologists) are not over nice in their logic so that, as a matter of actual practice, they have proceeded gaily with their experiments, leaving the purely methodological analysis of their procedure for *post facto* dissection. It is such a post facto dissection that the present paper wishes to undertake.

Our task is to discover by what criterion, implicit or explicit, one does actually recognize and label the emotions in the non-introspecting organisms. It seems obvious that this criterion, whatever it may be, is to be found somewhere in the *externals* of the situation. Either, that is, one recognizes and labels the emotions by virtue of the sorts of *stimuli* which evoke them, or by virtue of the sorts of *responses* in which they eventuate, or lastly, perhaps, by virtue of something about *both* stimuli and responses. The aim of this paper is to discover which of these criteria it may be.

Before proceeding to the task, however, let us put the question in a wider setting. Suppose that, instead of being concerned with the emotions of the non-introspecting organisms, we think ourselves back into the good old days when

we were concerned with the emotions of the introspecting organisms. How, *then*, did we distinguish between anger and fear? The answer, of course, is that we induced introspection.[1] We asked the organism to tell us whether he was angry or whether he was afraid. But how do we know what the words 'angry' and 'afraid' mean? There is no mystical connection between the emotional states, as such, and these particular words. A Frenchman will say not 'angry' but 'en colère,' and a German, 'zornig.' The connection between the particular words and the particular emotional states must be acquired. But how?

Suppose we turn to the young child learning to talk. He hears the words 'anger' or 'angry' in certain situations. I behave angrily and he is told that I am 'angry.' The child cannot get inside me nor directly experience my anger. The one thing therefore which can ultimately identify the word for him and give it its meaning, must be something about my behavior or the situation which produces it, or both. Or, again, he exhibits anger in his behavior and is told that he is 'angry.' Again the word must get its identification and meaning from something about the behavior-situation and from that only. But, perhaps you will say that since in this second case the child does directly experience his own conscious emotion, as such, this time the meaning of the word will get directly attached by him to the conscious state as such. Very good. But, be it noted, this conscious state when you tell him that he is angry no more gets directly into you than did your conscious state, when you were angry, get directly into him. It was only because he was *behaving* in such and such a way that you knew that he was angry and told him so. You could not see his anger any more than he could see yours. In both cases it was only what may perhaps be called the *behavior-analogue* of the emotion which was the common term mediating between you. Hence, ultimately it seems to be this behavior-analogue which defines, if not your meanings for, at any rate your uses of, the word. When an introspecting organism reports that he is angry, what

[1] Of the 'Kundgabe' variety.

you thereby know and identify is not his conscious state as such (which never gets into you) but rather that he is in a condition which makes him likely to behave in a certain way. You know that he is probably going to behave in the way which determined your and his original acquisition of the word. Introspection, no more than any other type of behavior, can display directly to you the 'private contents' of the other person's mind.

The situation involves a second point which needs emphasis. It is not the actually exhibited behavior, as such, which constitutes, behavioristically speaking, the emotion, but rather the *readiness* or *drive* for such a behavior—a readiness or drive which, as a result of acquired habits, may come to vent itself sometimes in quite other than the original, and initially defining behavior.[1] But it is only through tracing these other behaviors back to this initial and defining behavior that we know what emotion they express.

It appears that the study of emotions in the introspecting organisms is ultimately in much the same status that it is in the study of the non-introspecting organisms. The animal and abnormal psychologists have in reality been no more hasty than, and indeed perhaps not as hasty as, were the good old introspectionists themselves. The latter no less than the former proceeded without first making clear to themselves the nature of their methodological assumptions. The introspective study of emotions no more than any other study of them gets directly at private mental contents. For both types of study the emotion is in the last analysis defined, characterized, and identified in terms of a *behavior* situation.

If the above be true, it is indeed high time we sought to discover the nature of these ultimate and defining behavior-situations. As a step in this direction, let us turn to Watson's now classical study on the emotions of infants.[2] There, if anywhere, it would seem as if we might get light upon our problem. But even there, it appears, we shall have

[1] The introspective speech reaction constitutes one of the most common of these acquired behaviors.

[2] Watson, J. B., 'Psychology from the Standpoint of a Behaviorist.' Philadelphia, Lippincott, 1919. Chapter 6.

difficulty. For, strangely enough, Watson himself seems to have been almost as serenely and naïvely unconscious of the real theoretical crux of the situation as the most dyed-in-the-wool introspectionist. Note, for example, the naïvete of the following: "What stimulus," he asks, "apart from all training will call out fear responses; what are these responses, and how early may they be called out?"[1] In the first part of his question he defines fear in terms of its responses and asks what are its stimuli, and then in the second part he immediately turns round and asks what are its responses. In other words, he knows *neither* the stimuli *nor* the responses which define fear and yet he knows fear. Here he might perhaps reply that he knows fear as he knows all emotions, by means of its internal responses. "An emotion is an hereditary 'pattern-reaction' involving profound changes of the bodily mechanism as a whole, but particularly of the visceral and glandular systems."[2] But it is to be pointed out that in the particular case in question no knowledge of the internal responses in fear was, as a matter of fact, obtained by Watson, or even suggested in his account.

Truly, our subjectivistic friends are not to be blamed for suspecting a nigger in the Watsonian wood-pile. Unfortunately for them, however, his inconsistency does not lie as they seem to suppose, in any secret reliance by him upon an immediate intuitive knowledge of the private mental contents of other organisms, including infants. Rather it is that he possesses an immediate, though unexpressed, recognition of the external *behavior* characteristics which define emotions.

Let us turn now to the record of his actual observations and see if we cannot discover for ourselves what these defining behavior characteristics were, not only for fear, but for each of his three emotions. We may tabulate the observations, as follows:

[1] *Op. cit.*, p. 199.
[2] *Op. cit.*, p. 195.

FEAR

Stimuli	*Responses*
1. Suddenly removing all means of support (dropped from the hands to be caught by an assistant).	Sudden catching of breath. Clutching (grasping reflex). Blinking of eyelids. Puckering of lips. Crying.
2. Loud sound.	In older children, possibly flight or hiding (not yet observed by Watson as original reactions).
3. Sudden push or slight shake (when just falling asleep or just waking up).	
4. Sudden pulling of supporting blanket (when just going to sleep).	

Any or all of the responses can apparently appear for any one of the stimuli (the account is perhaps not altogether clear upon this point). The grasping reflex, however, invariably appears when the child is dropped.

RAGE

Stimuli	*Responses*
Hampering the infants movements, *i.e.*, holding of face or head; or holding arms tightly to sides. This 'is the factor which apart from all training brings out the movements characterized as rage.'	Crying. Screaming. Body stiffening. Fairly well coördinated slashing or striking movements of the hands and arms. Feet and legs drawn up and down. Holding breath. In older children, kicking, slapping, pushing.

LOVE

Stimuli	*Responses*
Stroking or manipulation of an erogenous zone.	If the infant is crying, crying ceases.

LOVE—*Continued*

Tickling.	A smile appears.
Shaking.	Attempts at gurgling and cooing.
Gentle rocking.	In slightly older children, the extension of the arms.
Patting.	
Turning on stomach across attendant's knee.	

Surveying the above lists, I think we are ready to agree that these really were cases of fear, rage, and love, respectively. But why do we agree? The distinguishing characteristics hardly seem to lie in the individual stimuli as such. It would be no outrage, to my conception of fear, at least, if none of the listed stimuli had actually happened to evoke fear, or indeed, if other quite different stimuli, had evoked it. If the dropping of the child had caused not fear but anger, I should have felt no particular surprise. Indeed the same may be said for any of the other stimuli. It can hardly then be the stimuli, as such that defined the emotions. But neither does it seem to have been the responses, *merely as such*, that defined them. Sudden catching of the breath, random clutching (*i.e.*, the grasping reflex), blinking of eyelids, puckering of the lips, crying, flight and hiding, these, just as such and such muscle contractions, do not define fear. Catching of the breath, merely, as catching of the breath, grasping, merely as grasping, blinking, merely as blinking, puckering, merely as puckering, crying, merely as crying, running away, merely as running away, and hiding, merely as hiding, might severally occur in any one of numerous *non*-fear situations. When, however, we take them all altogether and evaluate them not merely as involving such and such muscle contractions, but rather as obviously calculated to produce, to be appropriate for, such and such a reaction back upon the stimuli which produced them, then they *do* indicate fear.

It is not a response, *as such*, nor a stimulus situation, *as such*, that constitutes the behavior definition of an emotion, but rather the response as affecting or calculated to affect the

stimulus situation. The responses of catching breath, clutching, blinking, puckering of lips, crying, running, and hiding seem all, with the possible exception of the first, to be of a nature to *protect* the organisms from exciting stimuli of one sort or another. Clutching protects against dropping, blinking against light, puckering of lips against things shoved into the mouth, and crying, running away, and hiding, against all kinds of stimuli either by bringing help or by totally removing the organism. They are all *protection* responses. And it is in this character that they alone identify the instance as one of fear.

Turning now to anger. Again it is obvious that it is neither hampering stimuli, as such, nor slashing, striking, crying, stiffening responses, as such, that identify the case as anger, but rather, the fact that slashing, striking, crying, stiffening are all responses calculated to produce, to be appropriate for, another type of back action upon the exciting stimulus, viz: the destruction of the latter. Anger is a destruction-of-the-stimulus response. Fear and anger are alike in that they both cause the removal of the stimulus, but they are different in that whereas the behavior situation which defines fear is one in which the organism is merely protected against, the behavior-situation which defines anger is primarily one in which the stimulus is destroyed. The one operates by leading away from, the other by leading towards and destroying.

Consider now, finally, his case of 'love.' The responses here seem all appropriate for the further continuation of the stimulus. The stopping of crying, smiling, cooing, gurgling, the stretching out of the arms are one and all, given a social environment, responses calculated either to leave the stimulating condition undisturbed or actually to reach out and get more of it. Human organisms have evolved in a social environment and, given this fact, the early post-natal appearance of smiling, cooing, gurgling, stretching out of the arms can easily be explained as having evolved as appropriate for 'getting more of the given stimulus.'

It must be observed that all response tendencies would

apparently fall into one or the other of the two classes of 'tending to remove' or of 'tending to continue and get more of' the stimulus. Anger and fear go in the first group and love in the second. We have not as yet, however, distinguished between love and other possible innate 'getting more of' tendencies. Watson mentions no other innate tendencies under emotion. He does, however, mention others under 'instinct,' for example, 'manipulation' or 'curiosity.' Manipulation or curiosity, assuming that there is such an innate propensity, would seem to be another original 'to get more of' tendency. How are we to distinquish between it and love? The answer seems to be that whereas love is a 'to get more of' by encouraging or enticing; curiosity is a 'to get more of' by examining, or exercising one's sense organs upon.

To sum up, now, our three emotions. In the case of each it appears that the thing which is characteristic and which defines it for us as an instance of such and such an emotion is not the nature of the individual stimuli, as such, nor the nature of the individual responses, as such, but rather the gross *behavior-result*, *i.e.*, the nature of the back-action of the responses upon the stimuli. And these gross behavior results, be it noted, are not privately and subjectively defined but are perfectly objective characteristics about the behavior-situations which even those who run may read. The human infant (*albeit in a blind haphazard fashion*) innately tends to protect itself from certain stimuli, to destroy certain others, and to encourage or entice still others, and we can observe him doing it. These are the sorts of facts about total behavior-situations which we learned as children to designate as fear, rage, and love, respectively. They are facts not of stimulus alone nor of response alone but of *response-as-back-acting-upon-stimulus*.

Certain other features about the situation must also be considered. In the first place, it should be emphasized that those behavior-tendencies which define the emotions are probably always of a relatively blind and chaotic nature. A *precise and accurate* getting away from or a *precise and*

accurate destruction of, the stimulus would seem to be hardly the behavior-analogues of emotions but of relatively cold mental states. Certainly, intense fear and intense anger as well as intense love would seem to exhibit a certain convulsiveness in their behavior analogues.[1]

Finally, and this is a most crucial point, it may perhaps be objected that as yet we have really offered behavior-analogues for one phase of emotions[2] only, viz. their purely impulsive phase, and that emotions are not merely impulsions but rather and more significantly, unique types of more or less passive mental presentations. Very good, but when so characterized do they not reduce to organic sensations? (No one yet seems to have been able to avoid the James-Lange theory.) But as sensations, they are again susceptible to (and indeed can find none other than) a further behavioristic definition. In a previous article I have already shown (or if you prefer *attempted* to show) that sensations also can, in the last analysis, be defined in behavioristic terms only.[3] We may sum up the gist of the argument there presented as follows:

Every experimental study of the sensation-qualities of another organism, including the introspective examination of those of a normal, adult human, can be seen to reduce in the last analysis to the principle of the Yerkes-Watson discrimination box. In the use of the latter, a pair of stimuli are presented and the animal is forced, if he can, to discriminate between them. In this way, a single stimulus may be paired with as many others as desired. And the observer learns which of these other stimuli can be discriminated from the given one and which can not. Indeed, he can learn all the *degrees* of similarity and difference of any one stimulus to all other stimuli. But this is just what, and no less than, he can discover from human introspection. The words with

[1] See in this connection Kantor's contention that an emotion corresponds to an actual breakdown of behavior. Kantor, J. R., 'An Attempt toward a Naturalistic Description of the Emotions,' PSYCHOL. REV., 1921, **28**, 19–42, 120–140.

[2] A phase which, indeed, we would be perfectly willing to designate as instinct rather than as emotion, if that should seem more consonant with desirable usage.

[3] Tolman, E. C., 'Concerning the Sensation Quality—A Behavioristic Account,' PSYCHOL. REV., 1922, **29**, 140–145.

which one introspects upon one's sensation-qualities acquired their meaning in terms of the standard stimulus-situations, to which as children we heard them applied, and in terms of the similarities and differences of these standard situations. The word 'red' as used in inter-human communication means simply a certain standard stimulus or stimuli plus the similarities and differences of this given stimulus to such and such other stimuli. Its meaning is a *classification* of the given stimulus, a classification which is read off from purely behavior observations. What 'red' may be as a private 'feel' for you, I do not know. I only know it as a something produced in you by such and such ether waves, and which appears to you as thus and thus similar to, or different from, that which is produced by such and such other ether waves.

Applying these conclusions to the emotions, it means that the passive, substantive, mental presentation, side of an emotion is defined in terms of the stimulus or stimuli which produce it and in terms of the similarities and differences (for the purposes of behavior discrimination) of this stimulus or these stimuli to such and such other stimuli. Further, the stimuli in question are primarily internal organic ones (*i.e.*, accepting the James-Lange theory) and they are presumably produced by the organic and muscular changes which result from or accompany the impulsive phase of the emotion. It must be observed, however, that an experimental determination of these internal stimuli and of their similarities and differences to other stimuli is very difficult, if not impossible, in the case of the non-introspecting organisms. Much the same, however, can be said for the case of the introspecting organisms. With both types it seems very difficult to arrange it so that the organisms will react discriminatively to the resultant internal stimuli, as such, rather than to the external stimuli which by calling out the emotional attitude are producing these internal stimuli. We know, that is, very little as regards the similarities and differences between the substantive presentation sides of fear and anger in either men or animals. Though we are, to be sure, beginning, through

the work of Cannon and others, to learn as a first step, something, about the probable stimuli which produce them.

These practical difficulties, however, are of less importance since as a matter of practical value it seems to be the impulse sides of the emotions which are of more importance. It matters little that we cannot yet describe fear, anger, or love as mental presentations, *i.e.*, as groups of sensations, as long as we can and do describe them as types of *impulse*.

We may sum up the main points of the argument and the conclusions as follows:

1. The recent change of direction in the study of the emotions from the introspecting to the non-introspecting organisms raises the theoretical question as to the ultimate definition of the emotion.

2. A careful examination of the implications of actual procedure seems to indicate that for *both introspecting* and *non-introspecting* organisms the definitions are ultimately *behavioristic*.

3. Further analysis shows that such behavioristic definitions have two parts: (*a*) the definition of the impulse side of the emotion as a *drive* or *tendency* toward a particular type of behavior-result, of *response-as-affecting-stimulus; e.g.*, in the case of fear, protection from stimulus, in the case of anger, destruction of stimulus, and in the case of love, encouragement or enticement of stimulus; and (*b*) the definition of the substantive, presentation, side of the emotion as a particular group of internal sensations, which sensations themselves are ultimately also to be defined in purely behavioristic terms, *i.e.*, in terms of stimuli and of their relations of similarity and difference to other stimuli. (See previous paper.)

4. It seems, however, to be the impulse phase of the emotion that is of more practical interest and importance, and this is apparently the phase which is the more easily identified and defined.

5. Finally, we would conclude that further attempts at behavioristic identification and definition may well precede or accompany future programs for empirical research.

XUM

THE ANTI-INSTINCT FALLACY [1]

BY WESLEY RAYMOND WELLS

Lake Forest College

The fundamental error in the instinct theory, according to many recent deniers of instinct, is the failure to observe that all action-patterns, or at least all socially significant ones, are *acquired*, either after birth, or at least after the fertilized ovum has begun its development. Therefore, these critics assert, all socially significant action-patterns should be looked upon as habits, not instincts, since the term 'instinct,' through scientific usage, properly refers only to inherited forms of response. There is assumed, at least implicitly, in this position of the deniers of instinct the view that whatever is inherited must be due wholly to germinal factors, and cannot be acquired, that is, cannot be subject to a developmental history under environmental influences. It is this assumption which constitutes the fundamental fallacy in the writings of the majority of the anti-instinct psychologists at the present time.

The tendency that I refer to may be sufficiently indicated merely by reference to such names as those of Messrs. Bernard, Allport, Kuo, Kantor, and Ayres, to mention no others, and I will quote brief typical statements from only two of them. One of them asserts: "Human instincts . . . in the adult individual are completely absent." "It is axiomatic that all our reactions, no matter how basic or widespread, must have a history in the actual behavior life of the person. No capacity or potentiality can be anything but an acquired reaction system." [2] And another says similarly: "In the present paper we attempt to deny not only the classification of instincts, but their very existence." "The so-called in-

[1] Presented at the meeting of the American Psychological Association, Harvard University, December 28, 1922.

[2] Kantor, PSYCHOL. REV. 1920, 27, 52; 1921, 28, 330.

stincts are in the last analysis acquired trends rather than inherited tendencies." [1] Not all of those whom I have called the anti-instinct psychologists, to be sure, deny the existence of instincts *in toto*, as Mr. Kuo does. Some of them accept what *they* call instincts; but what some of them call instincts are only simple action-patterns that are more properly called mere reflexes. And, even though they do not all deny completely what *they* regard as instincts, they do deny the instinct theory as it is believed in by those who attempt to make use of it as a fundamental hypothesis in social and abnormal psychology.

There is much truth in some of the claims of the anti-instinct psychologists. But if, as a result of their criticisms, it should appear that the instinct theory is necessarily involved in animistic, vitalistic, and Lamarckian heresies, social psychologists who wish to consider themselves scientific, and who still wish to use the theory, may derive some preliminary degree of comfort from recollecting that Jacques Loeb, high priest of scientific, mechanistic orthodoxy that he is, recognizes such instincts as the food instinct, sex instinct, parental instinct, gregariousness, and even the instinct of workmanship, all of which he names, and the hereditary nature of which he affirms.[2]

A partial reconciliation of opposing views may conceivably be effected through an examination of the precise meaning of 'inherited' and 'acquired.' In calling attention to the fact (which should have been obvious, but which seems to have been generally overlooked) that all action-patterns do have a developmental history under environmental influences in each individual, these writers have done a valuable service; but they err in supposing that structures having a developmental history may not at the time be inherited, in the only proper meaning of the term. Such an error arises from accepting

[1] Kuo, *J. of Phil.*, 1921, 18, 648. Further references to writings of anti-instinct psychologists may be found in my article in the *J. of Abnorm. and Soc. Psychol.*, 1921–1922, 16, 336.

[2] See 'The Mechanistic Conception of Life,' pp. 30, 31; 'The Physiology of the Brain,' pp. 194, 197, 242; 'Forced Movements, Tropisms, and Animal Conduct,' Ch. 18.

uncritically the false popular contrast between 'inherited' and 'acquired,' which would make them mutually exclusive.

Even if the question at issue were one merely of verbal usage, it would be important, for it is of the utmost importance in scientific discussion to have a precise terminology. But, as will be seen, the question is much more than merely verbal, for there are involved facts which have an important bearing on the instinct theory. Sir E. Ray Lankester as long ago as 1894 called attention to some of these facts,[1] and Professor E. S. Goodrich a year ago in his presidential address at Edinburgh before the Zoölogy Section of the British Association for the Advancement of Science gave an excellent review of the topic.[2]

'Inherited' in its strict sense means 'acquired in individual development as a result of germinal factors, or determiners, plus *normal* environmental influences.' Non-inherited structures are those acquired under the influence of abnormal [3] environmental conditions, and without direct germinal sources.

If 'inherited' meant 'transmitted as such in the germplasm,' then there could be no inherited action-patterns; but neither could any somatic traits or characters whatsoever be inherited (and heredity is a proved fact, especially in view of the work of Mendel). At the moment of fertilization of the ovum no somatic characters are present, and none develop except under environmental influences of temperature, moisture, food, and other stimuli causing muscular and glandular responses of the organism. That is, *all* bodily structures are *acquired* in the sense that without an environment the germinal factors by themselves would be meaningless abstractions. Mr. Bernard speaks of "the point of fertilization, at which the combination of hereditary characters takes place

[1] 'Acquired Characters,' *Nature*, 1894–95, 51, 102, 03.

[2] 'Some Problems in Evolution,' *Science*, 1921, 54, 529–38.

[3] The term 'abnormal' as here used does not denote anything pathological, but rather the biologically unusual. The terms 'constant' and 'variable' might be substituted for 'normal' and 'abnormal,' if misconstruction of these words could be avoided. In the biological literature, however, the terms 'normal' and 'abnormal' when applied to environmental conditions do not have the connotation that they have in psychological literature when applied to types of behavior; and I have had in mind the biological usage, since this paper has dealt largely with a biological problem.

in the individual newly beginning life,"[1] and other deniers of instinct seem to hold the same erroneous concept. The truth is that at the time of fertilization no characters (by which must properly be meant somatic, or bodily, traits) are present. There are present only germinal determiners of characters which can appear, not as a result of the germinal determiners alone, but only as a result of a process of growth and development under environmental influences.

It is true, obviously, that all habits are acquired action-patterns, and that the formation of habits can be traced in the developmental history of the individual. The converse of this, however, that all action-patterns the development of which can be traced must be habits, does not follow. All men are mortal, but not all mortal creatures are men. The simple fact is that inherited structures, whether of fur and feathers, bone and muscle, physical stature and eye coloration, or nervous tissue (including synaptical connections), while conditioned in part by germinal determiners, are not transmitted *as such* in the germ-plasm. A normal environment must be presupposed from the moment of fertilization. A child that grew up without a surface, such as the floor or ground, upon which first to lie and sit, would never creep, stand, and walk, but such an environment would not be normal, or even possible. No gregarious instinct of any sort could be inherited in an individual reared from birth in complete isolation, for such would not be an environment biologically normal or possible.

It has been shown experimentally in the case of easily observed inherited structures that the substitution of an unusual or abnormal environment will cause the development of structures unlike those normally inherited in the species. A striking experiment is that of Professor Stockard,[2] first performed in 1907, by which the fish *Fundulus* developed a single, median eye when the amount of magnesium chloride was increased above the normal in the sea-water in which the eggs were developing. Yet paired eyes are properly regarded

[1] PSYCHOL. REV., 1921, **28**, 96.

[2] C. R. Stockard, 'The Development of Artificially Produced Cyclopean Fish—"The Magnesium Embryo",' in the *J. of Exper. Zool.*, 1909, **6**, 285–337.

as hereditary in the fish *Fundulus*. Other experiments might be cited,[1] but this one is enough to illustrate the point at issue.

The normally *inherited* paired eyes of the fish *Fundulus* are *acquired* in the sense of developing under *normal* environmental influences, without which they would not come into existence. The fact that they are acquired in this sense does not take them from the list of heritable characters; it simply illustrates a situation of universal extent, namely, that 'inherited' means 'determined by germinal factors plus normal environmental conditions.'

If *all* characters are acquired, in the above sense, it becomes necessary to specify what is meant by the limited use of the term 'acquired characters' in discussions of Lamarckism. Lamarckian 'acquired characters' are not those produced merely under environmental influences, as some persons seem to think, but rather under the influence of *abnormal* environmental conditions, as in the case of the one-eyed fish mentioned above, or of the tailless rats of Weismann's famous experiment. From the fact that such non-inherited abnormalities are obviously acquired as a result of environmental conditions, many have seemed to assume that hereditary traits must be ones that are purely germinal in origin. No somatic traits are purely germinal in origin, however, as has been pointed out above, and still the notion of inheritance is sound.

Now there are action-patterns, in fact, the majority of them, in the average human adult which are acquired under abnormal or unusual environmental conditions, from the biological standpoint, and these are properly called habits. The environment of civilized man is largely abnormal from the biological point of view. But there *may* be other action-patterns, and ones of the most fundamental sort, acquired under the influence of biologically normal and inevitable environmental conditions, and these would be instincts. There seems to be a certain amount of agreement between this position and that of Professor Dunlap.[2] There is at least recognition by Professor Dunlap of environmental

[1] See, *e.g.*, Babcock and Clausen, 'Genetics in Relation to Agriculture,' pp. 20 ff.

[2] 'The Identity of Instinct and Habit,' *J. of Phil.*, 1922, **19**, 85–98.

influences in the development of inherited modes of response; but the distinction which I have made, following the biologists, between normal and abnormal environmental conditions would make possible a separate classification, which Professor Dunlap seems to deny, of habits, which are due to biologically abnormal environmental conditions, and which are without direct germinal sources.

A consideration of the meaning of 'inherited' and 'acquired' should precede any study of instinct. Then would follow an investigation of just what constitutes a biologically normal environment so far as the acquisition of inherited action-patterns is concerned. There should be stressed the importance, in a biologically normal environment, of internal stimuli, which, though internal to the organism as a whole, are properly to be regarded as environmental in that they are external to parts of the organism and to the germinal factors. There should be noted the importance of action-patterns involving chiefly the autonomic nervous system and the smooth muscles and glands, that is, the emotions in their physical aspect and the appetites and aversions, as constituent parts of some of the instincts. I refer here to distinctions made by Watson,[1] and to studies made by Cannon,[2] and by Craig.[3] That conditions of use or exercise of action-patterns already developed constitute internal stimuli, that is, stimuli of proprioceptor and interoceptor organs, influencing the development of further action-patterns, should not be overlooked. The sense in which the present environment of man still inevitably contains certain universal factors identical with those of the normal primitive and even pre-human environment, in spite of obvious changes in concrete, particular details, should be made clear. Such problems as these need to be considered before the positive evidence that there are fundamental and important human instincts can be properly evaluated. Upon most of these problems I have touched at considerable length elsewhere.[4] It is not necessary

[1] 'Psychology from the Standpoint of a Behaviorist,' pp. 195, 231.

[2] 'Bodily Changes in Pain, Hunger, Fear and Rage,' especially pp. 188 ff.

[3] 'Appetites and Aversions as Constitutents of Instincts,' *Biol. Bull.*, 1918, 34, 91–107.

[4] *J. of Abnorm. and Soc. Psychol.*, 1921–1922, 16, 334–43; 17, 153–161.

for my present purpose, however, to raise these questions. I am not here trying to prove the existence of human instincts (though I believe them capable of adequate proof), but merely to disprove the underlying assumption of certain deniers of instinct by pointing out what I have called the anti-instinct fallacy, namely, the fallacy of claiming that no action-patterns which are acquired, in the sense of having a developmental history, can at the same time be instincts, that is, inherited action-patterns.

It might be added, in conclusion, that the fallacy which I have emphasized is really a part of a more inclusive error of many of the anti-instinct psychologists, namely, the error of losing sight of the biological, evolutionary background of present human behavior. If we accept the biologists' classification of man within the animal kingdom, and if we believe in continuity in evolution, we should bring to the study of human behavior such evidence regarding Mendelian inheritance, natural selection, and the like, as the study of biology gives us. Professor McDougall has expressed this thought well in his recent article on instinct.[1] One of the anti-instinct psychologists yesterday in his paper stated that he differed from Watson in placing less emphasis upon the biological aspect of personality, and in preferring to study behavior empirically without any presuppositions. My reply to such a position would be in the form of a question as to why we should fail to utilize such generally accepted biological knowledge as is at hand, in order to interpret aright the facts of human behavior as they come under our observation.

[1] *J. of Abnorm. and Soc. Psychol.*, 1921–1922, 16, 285–333.

DISCUSSION

BEHAVIOR VS. INTROSPECTIVE PSYCHOLOGY

It was a pleasure to the undersigned to read Professor Fernberger's article with the above title in the November number of THE PSYCHOLOGICAL REVIEW, and to find therein corroboration of the position which he himself had defended in a recent book, 'The Foundations of Psychology' (Princeton University Press, 1921)—especially pages 55–62. The differences between us are largely on matters of terminology, and all that I should regard as essential in what distinguishes my position from that of Dr. Fernberger would be my insistence that the term *psychology* means and can only mean the science of mind (consciousness, mental life, or other more or less equivalent expression), and that some other term must be invented for the science of behavior, and for that comprehensive science which covers the study of consciousness and of behavior in their mutual relations.

Dr. Fernberger proposes the separation of psychology into two distinct sciences—that of consciousness, and that of behavior; whereas I would restrict the term psychology to the science of consciousness, and have suggested *praxiology* (after Mercier and Dunlap) as an appropriate term for the science of physical behavior, and Dr. Dunlap's term *psychobiology* for the inclusive science which covers both the others. I should demur, however, to Dr. Fernberger's dictum that psychobiology as so defined would not be a science, but "a philosophical, speculative procedure." Surely the data of this general science are as open to observation, description, and explanation as are those of either of its component parts or specialties.

JARED S. MOORE

WESTERN RESERVE UNIVERSITY